[illegible]

PRELIMINARY MAINTENANCE INSTRUCTIONS

FOR

RADIO TRANSMITTER BC-640-A

Manufactured By

BENDIX RADIO

ION OF BENDIX AVIATION CORPORATION

D-11

~~RESTRICTED~~

PUBLISHED BY AUTHORITY
OF
THE CHIEF SIGNAL OFFICER

Destruction of Abandoned Materiel in the Combat Zone

In case it should become necessary to prevent the capture of this equipment, and when ordered to do so,

DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

MEANS:—

1. **Explosives, when provided.**
2. **Hammers, axes, sledges, or whatever heavy object is readily available.**
3. **Burning by means of incendiaries such as gasoline, oil, paper, or wood.**
4. **Grenades and shots from available arms.**

PROCEDURE:—

1. **Obliterate all identifying marks. Destroy nameplates and circuit labels.**
2. **Demolish all panels, castings, switch- and instrument-boards.**
3. **Destroy all controls, switches, relays, connecting means and meters.**
4. **Rip out all wiring in electrical equipment. Smash water cooling, gas and oil systems in gas-engine generators, etc.**
5. **Smash every electrical or mechanical part whether rotating, moving or fixed.**
6. **Break up all operating instruments such as keys, phones, microphones, etc.**
7. **Destroy all classes of carrying cases, straps, containers, etc.**

DISPOSAL:—

Where possible, and time permits, bury all debris or dispose of it in streams or other bodies of water.

RESTRICTED

SUPPLEMENT NO. 1
15 Nov. '43

SUPPLEMENT
to
TEMPORARY INSTRUCTIONS
23 August 1941
and
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RADIO TRANSMITTER BC-640-A

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COVERING
RADIO TRANSMITTER BC-640-B

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Per TO No 00-1-16 12/22/53

TABLE OF CONTENTS

Par. Page

SECTION I, DESCRIPTION OF EQUIPMENT

1. General.. 1
2. Amplifier Panel PN-8-B 1
3. Oscillator Panel PN-9-B................................ 1
4. Modulator Panel PN-10-B................................ 1
5. Control Panel PN-11-A and Power Supply Panel PN-12-A... 1
6. Power Control Panel PN-13-B 1

SECTION II, INITIAL ADJUSTMENT AND TUNING

7. Tuning Procedure....................................... 1
8. Use of Meter Circuit Switch............................ 1

SECTION III, SERVICE AND REPAIR

9. General.. 2
10. Interchangeability of Panels.......................... 2
11. Replacement of Meter, Reference 139................... 4

LIST OF ILLUSTRATIONS

Figure 1-Operation of Meter Range and Circuit Switch. 2
Figure 2-Assembly of PN-8-B Meter, Reference 139..... 4
Figure 3-Cording Diagram, Meter Selector Switch...... 5
Figure 4-Schedule of Interpanel Connections BC-640-B. 6
Figure 5-Interpanel Schematic Diagram................

SECTION I - DESCRIPTION OF EQUIPMENT

1. GENERAL

Radio Transmitter BC-640-B is the same as Radio Transmitter BC-640-A with addition of dial locks on all tuning controls and reduction of the number of meters required. The components, dimensions and weights are the same as BC-640-A.

2. AMPLIFIER PANEL PN-8-B

Amplifier Panel PN-8-B is the same as Panel PN-8-A with tuning control locks and the addition of a switch and associated circuits to read the Oscillator Panel PN-9-B grid and cathode currents, and Modulator Panel PN-10-B cathode current.

3. OSCILLATOR PANEL PN-9-B

Oscillator Panel PN-9-B is the same as Oscillator Panel PN-9-A with tuning control locks added and no meters used. The electrical connections for the meters are connected to Panel PN-8-B through the interpanel cable.

4. MODULATOR PANEL PN-10-B

Modulator Panel PN-10-B is the same as Modulator Panel PN-9-A without the audio level meter. The meter connections are brought to the rear terminal board and connected to the Amplifier Panel PN-8-B through the interpanel cable.

5. CONTROL PANEL PN-11-A AND POWER SUPPLY PANEL PN-12-A

Control Panel PN-11-A and Power Supply Panel PN-12-A are used in Radio Transmitter BC-640-A and BC-640-B.

6. POWER CONTROL PANEL PN-13-B

Power Control Panel PN-13-B is the same as Power Control Panel PN-13-A with the addition of a mechanical lock for the hand wheel control of the variable transformer.

SECTION II - INITIAL ADJUSTMENT AND TUNING

7. TUNING PROCEDURE

The tuning procedure is the same as for Radio Transmitter BC-640-A with the exception of the use of 0-25 ma meter reference 139 and switch 154.

8. USE OF METER CIRCUIT SWITCH

To read the Exciter Cathode current (CATHODE CURRENT for PN-9-B) rotate the meter range and circuit switch on upper left corner of Amplifier Panel PN-8-B to extreme counter-clockwise position marked $^{\text{EXC-C}}_{100}$ and multiply the reading on 0-25 milliampere meter by 4. Full scale deflection of the meter will be 100 ma. Then, to read the cathode current in the crystal oscillator stage, rotate the switch in the upper right hand corner of PN-9-B panel to Co and multiply the reading of the 0-25 milliampere meter by 4. Likewise, to read the cathode current in the tripler, second tripler, doubler and IPA stages, rotate the switch in the upper right hand corner of PN-9-B panel to T1, T2, D and IPA respectively and multiply the reading of the 0-25 milliampere meter by 4.

To read input power amplifier grid current (IPA GRID CURRENT for PN-9-B) turn meter switch to $^{\text{IPA-G}}_{25}$ and the 0-25 ma meter is direct reading.

To read power amplifier grid current (GRID CURRENT for PN-8-B) turn switch to $^{\text{PA-G}}_{25}$ and the meter is direct reading.

To read in power amplifier the cathode current (CATHODE CURRENT for PN-8-B) set switch to $^{\text{PA-G}}_{100}$ and multiply the meter reading by 4.

To read modulator cathode current (MODULATOR CURRENT) set switch to $^{200}_{\text{MOD}}$ and multiply reading by 8.

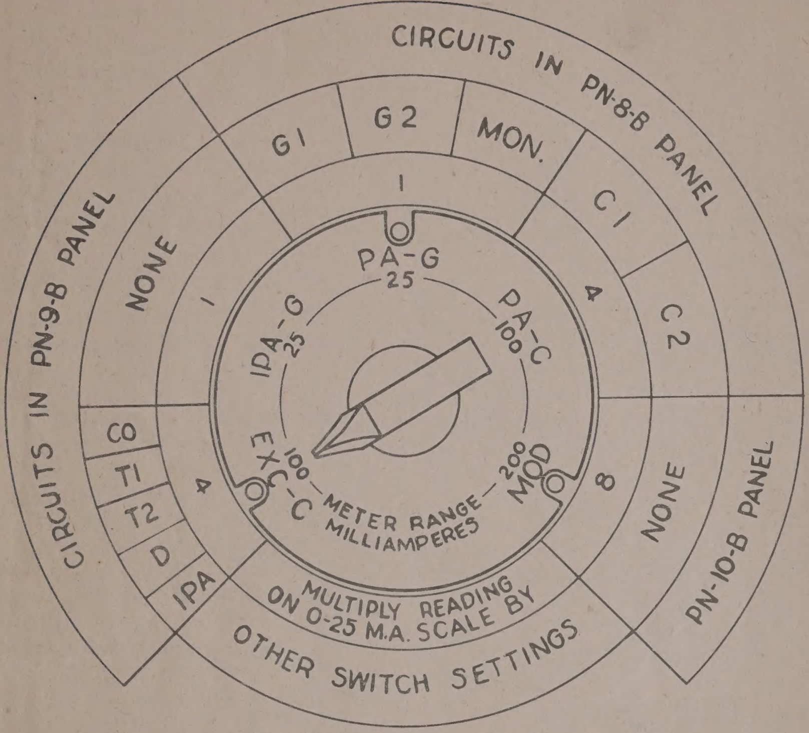

CIRCUITS IN PN-8-B PANEL
G1
G2
MON.
C1
C2
1
4
8
PA-G
25
PA-C
100
MOD
200
EXC-C
100
IPA-G
25
METER RANGE
MILLIAMPERES
MULTIPLY READING
ON 0-25 M.A. SCALE BY
OTHER SWITCH SETTINGS
CIRCUITS IN PN-9-B PANEL
NONE
1
4
CO
T1
T2
D
IPA
PN-10-B PANEL
NONE

FIGURE I OPERATION OF METER RANGE AND CIRCUIT SWITCH

SECTION III - SERVICE AND REPAIR

9. GENERAL

The servicing and repair information for transmitter BC-640-A applies to Radio Transmitter BC-640-B as the only differences are in the meter circuits and mechanical devices for locking tuning dials.

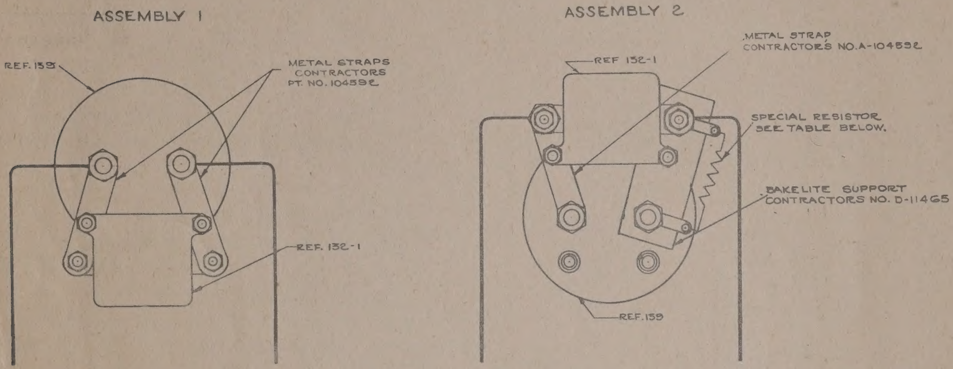
10. INTERCHANGEABILITY OF PANELS

It may be necessary when servicing this equipment to substitute panel assemblies. The following table will show the possibility of interchanging panels between BC-640-B and BC-640-A. (This substitution is satisfactory in some combinations because the terminals used for meter switch circuits are blank on BC-640-A equipment.)

Panel	*Substitute Panel*	*Effects on Operation*
PN-8-B (Amplifier Panel)	PN-8-A	COMBINATION NOT PERMITTED because of meter circuit required for PN-9-B and PN-10-B.
PN-8-A	PN-8-B	COMBINATION WILL WORK. However, the meter switch will not be effective on 3 positions. This would be satisfactory without changing the interpanel wiring cable.
PN-9-B (Oscillator Panel)	PN-9-A	SATISFACTORY SUBSTITUTION. However, meter switch on PN-8-B will not be connected to the oscillator panel. Therefore, not being effective on two positions.
PN-9-A	PN-9-B	THIS IS NOT SATISFACTORY. PN-9-B cannot be used on BC-640-A because meters are not used on PN-9-B and must be used with Panel PN-8-B.
PN-10-B (Modulator Panel)	PN-10-A	SATISFACTORY SUBSTITUTION, meter switch is on PN-8-B will not be effective on one position.
PN-10-A	PN-10-B	NOT SATISFACTORY. PN-9-B cannot be used on BC-640-A equipment unless PN-8-B panel is used.
PN-13-B (Power Control Panel)	PN-13-A	SATISFACTORY
PN-13-A	PN-13-B	SATISFACTORY, no electrical changes.

11. REPLACEMENT OF METER REFERENCE 139.

The meter used on Amplifier Panel PN-8-B, 0-25 ma. must be of such internal resistance to conform with the shunts used on all ranges. The following methods of assembly are used on this equipment:


ASSEMBLY 1
REF. 139
METAL STRAPS CONTRACTORS PT. NO. 104592
REF. 132-1
ASSEMBLY 2
METAL STRAP CONTRACTOR'S NO. A-104592
REF 132-1
SPECIAL RESISTOR SEE TABLE BELOW.
BAKELITE SUPPORT CONTRACTORS NO. D-11465
REF. 139

PT. NO. OF METER	MANUFACTURER	INTERNAL RES.	ASSEM.	VALUE OF SERIES RES.	CONTRACTOR PT. NO.
C-62063	ALL M'F'GS.	.4 OHMS	1	NONE REQ.	———
A104194-1	TRIPLETT	4 OHMS	1	NONE REQ.	———
A104194 1	WESTON	1.2 OHMS	2	2.8 OHMS	D-11818
A 104194 1	GEN. ELECTRIC	2.3 OHMS	2	1.7 OHMS	D-11820(A-112295-9)
A 104194 1	WESTINGHOUSE	.6 OHMS	2	3.4 OHMS	D-11821

FIG. 2 ASSEMBLY OF PN-8-B METER, REFERANCE 139

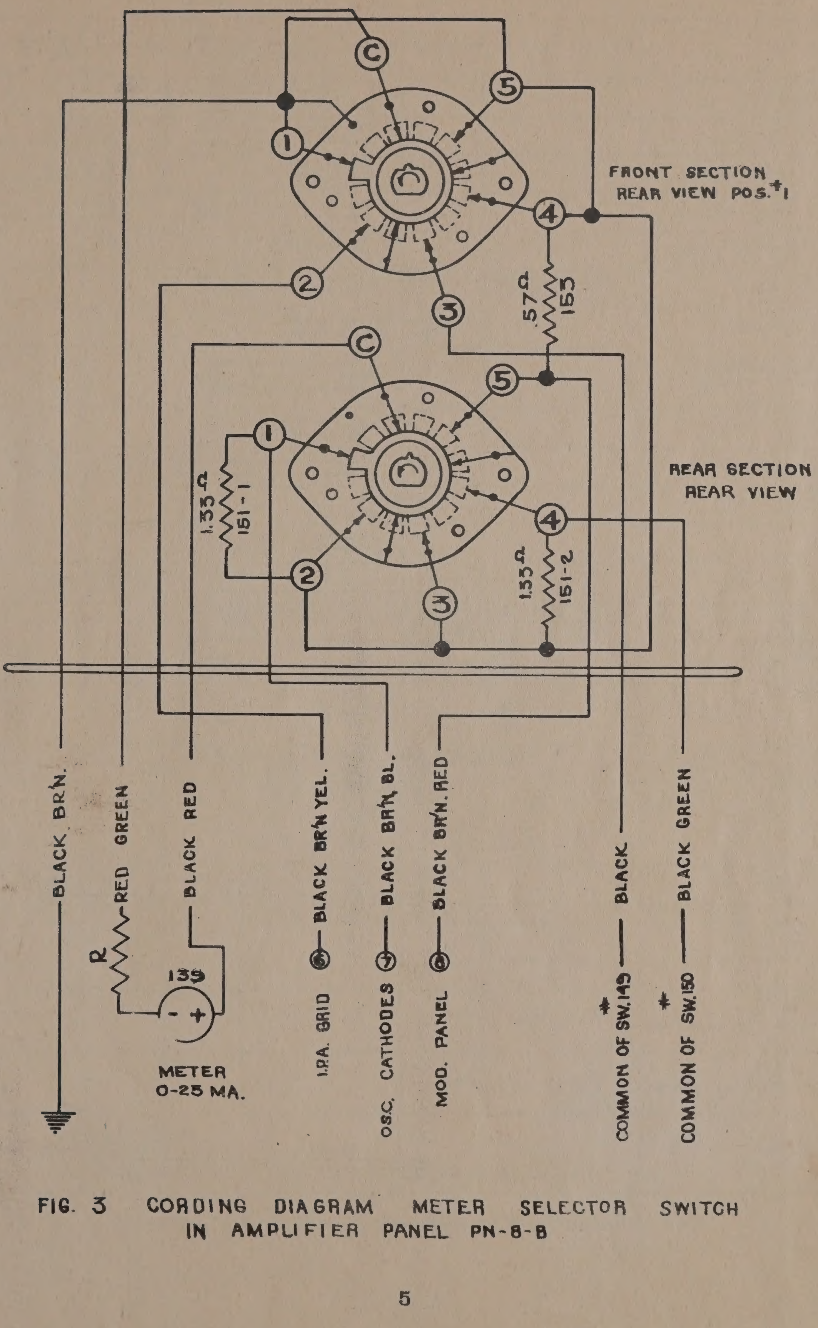

FRONT SECTION
REAR VIEW POS.*1
C
1
2
3
4
5
.57Ω
153
REAR SECTION
REAR VIEW
1.33Ω
151-1
1.33Ω
151-2
BLACK BR'N.
RED GREEN
BLACK RED
R
139
- +
METER
0-25 MA.
BLACK BR'N YEL.
I.P.A. GRID ⑥
BLACK BR'N BL.
OSC. CATHODES ⑦
BLACK BR'N. RED
MOD. PANEL ⑧
BLACK
* COMMON OF SW.149
BLACK GREEN
* COMMON OF SW.150

FIG. 3 CORDING DIAGRAM METER SELECTOR SWITCH IN AMPLIFIER PANEL PN-8-B

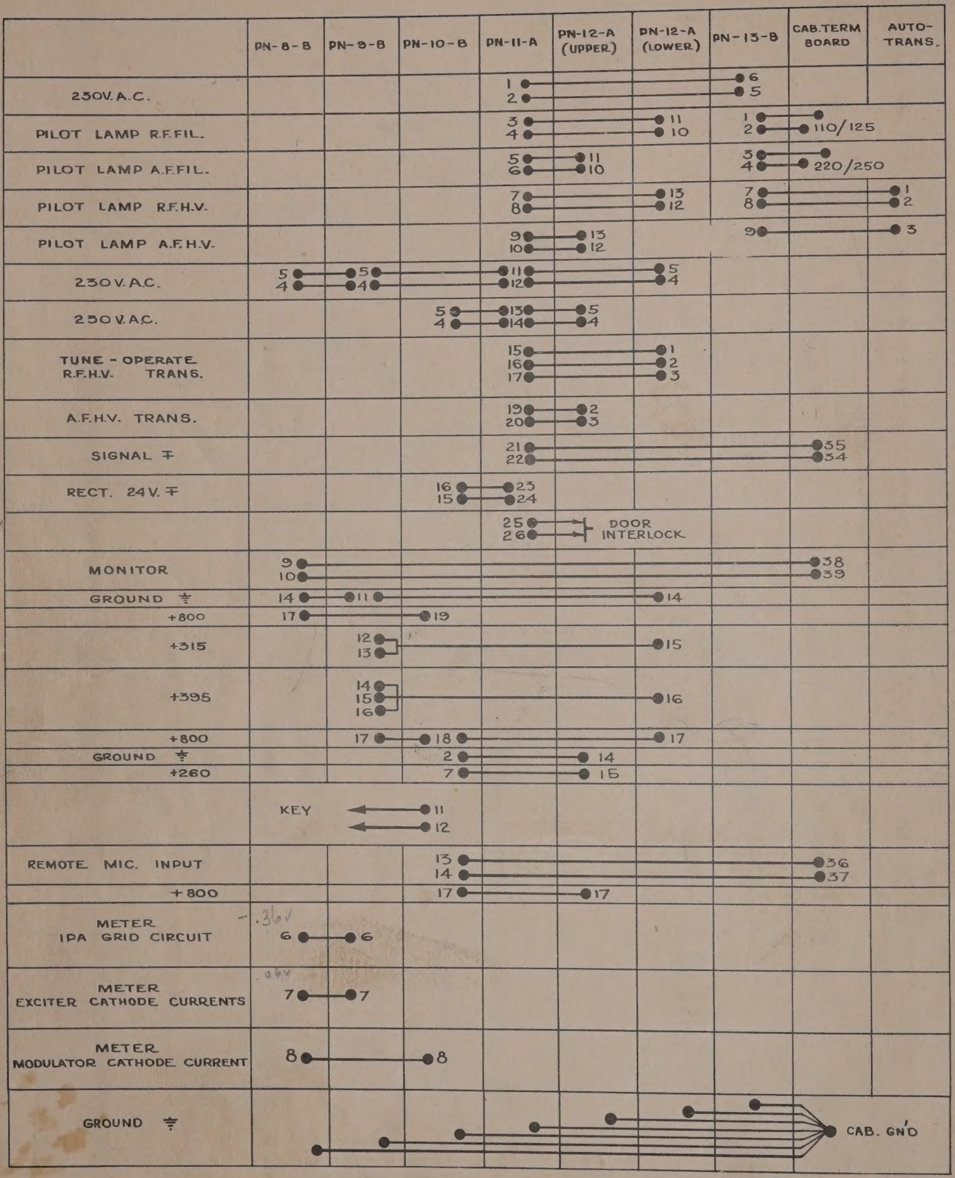
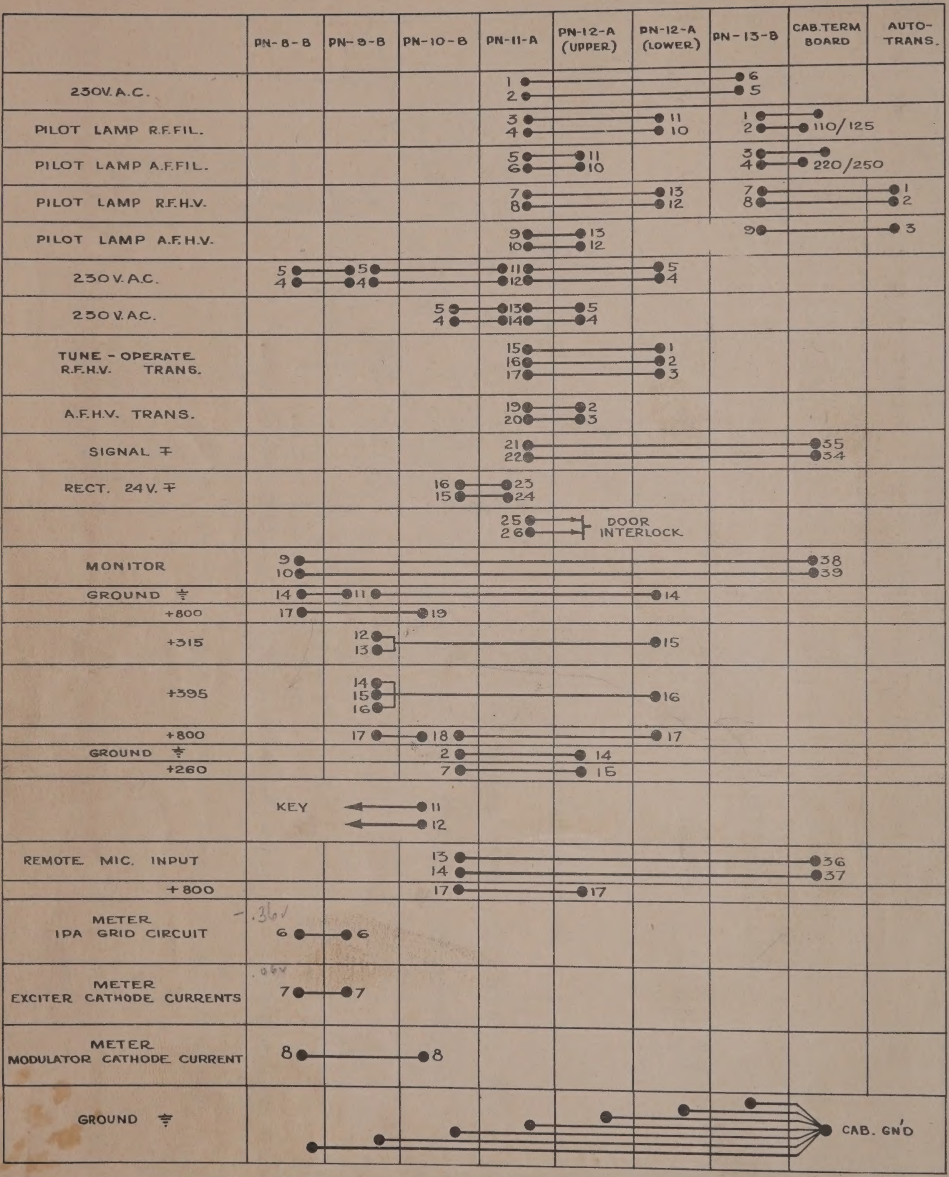

PN-8-B
PN-9-B
PN-10-B
PN-11-A
PN-12-A (UPPER)
PN-12-A (LOWER)
PN-13-B
CAB. TERM BOARD
AUTO-TRANS.
250V. A.C.
1 2
6 5
PILOT LAMP R.F. FIL.
3 4
11 10
1 2 110/125
PILOT LAMP A.F. FIL.
5 6
11 10
3 4 220/250
PILOT LAMP R.F. H.V.
7 8
13 12
7 8
1 2
PILOT LAMP A.F. H.V.
9 10
13 12
9
3
250 V. A.C.
5 4
5 4
11 12
5 4
250 V. A.C.
5 4
13 14
5 4
TUNE - OPERATE R.F. H.V. TRANS.
15 16 17
1 2 3
A.F. H.V. TRANS.
19 20
2 3
SIGNAL ∓
21 22
35 34
RECT. 24 V. ∓
16 15
23 24
25 26
DOOR INTERLOCK
MONITOR
9 10
38 39
GROUND ⏚
14
11
14
+800
17
19
+315
12 13
15
+395
14 15 16
16
+800
17
18
17
GROUND ⏚
2
14
+260
7
15
KEY
11 12
REMOTE MIC. INPUT
13 14
36 37
+800
17
17
METER IPA GRID CIRCUIT
-.36v
6 6
METER EXCITER CATHODE CURRENTS
.06v
7 7
METER MODULATOR CATHODE CURRENT
8 8
GROUND ⏚
CAB. GN'D

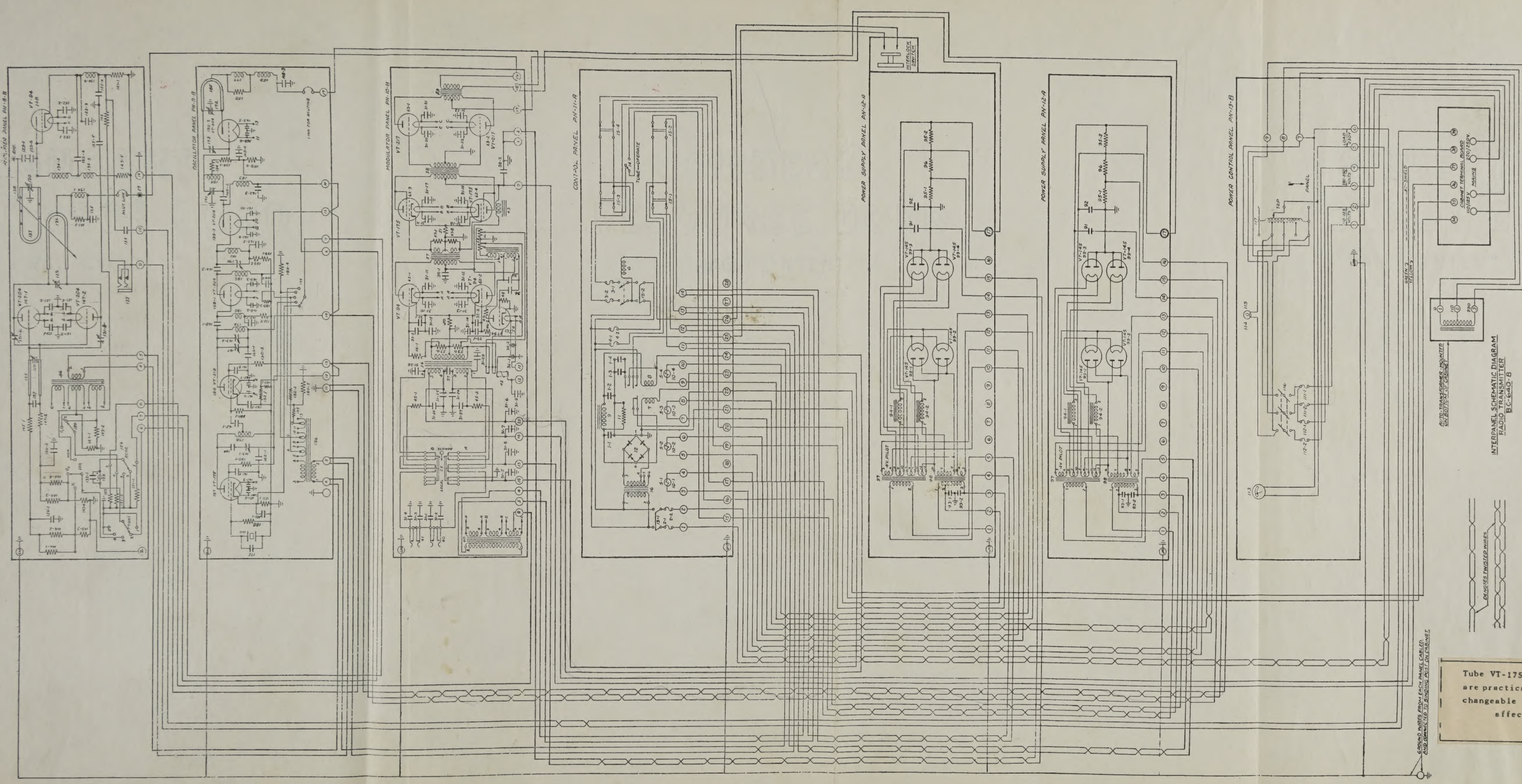
FIG.4 SCHEDULE OF INTERPANEL CONNECTIONS BC-640-B



	PN-8-B	PN-9-B	PN-10-B	PN-11-A	PN-12-A (UPPER)	PN-12-A (LOWER)	PN-13-B	CAB.TERM BOARD	AUTO-TRANS.
230V. A.C.				1 2			6 5		
PILOT LAMP R.F.FIL.				3 4		11 10	1 2	110/125	
PILOT LAMP A.F.FIL.				5 6	11 10		3 4	220/250	
PILOT LAMP R.F.H.V.				7 8		13 12	7 8		1 2
PILOT LAMP A.F.H.V.				9 10	13 12		9		3
230 V. A.C.	5 4	5 4		11 12		5 4			
230 V. A.C.			5 4	13 14	5 4				
TUNE - OPERATE R.F.H.V. TRANS.				15 16 17		1 2 3			
A.F.H.V. TRANS.				19 20	2 3				
SIGNAL ∓				21 22				35 34	
RECT. 24 V. ∓			16 15	23 24					
				25 26	DOOR INTERLOCK				
MONITOR	9 10							38 39	
GROUND ⏚	14	11				14			
+800	17		19						
+315		12 13				15			
+395		14 15 16				16			
+800		17	18			17			
GROUND ⏚			2		14				
+260			7		15				
	KEY ←		11 12						
REMOTE MIC. INPUT			13 14					36 37	
+ 800			17		17				
METER IPA GRID CIRCUIT	-.36v 6	6							
METER EXCITER CATHODE CURRENTS	.06v 7	7							
METER MODULATOR CATHODE CURRENT	8		8						
GROUND ⏚								CAB. GN'D	

FIG.4 SCHEDULE OF INTERPANEL CONNECTIONS BC-640-B

INTERPANEL SCHEMATIC DIAGRAM RADIO TRANSMITTER BC-640-B


POWER AMPLIFIER PANEL PN-8-B
OSCILLATOR PANEL PN-9-B
MODULATOR PANEL PN-10-B
CONTROL PANEL PN-11-A
POWER SUPPLY PANEL PN-12-A
POWER SUPPLY PANEL PN-12-A
POWER CONTROL PANEL PN-13-B
INTERLOCK SWITCH
AUTO-TRANSFORMER MOUNTED ON BOTTOM OF CABINET
DENOTES TWISTED WIRES
INTERPANEL SCHEMATIC DIAGRAM RADIO TRANSMITTER BC-640-B
GROUND WIRES FROM EACH PANEL CABLED, AND CONNECTED TO BINDING POST ON CABINET.

Tube VT-175 (1613) and VT-66 (6F6) are practically alike and are interchangeable in this equipment without affecting performance.

D-12274

POWER AMPLIFIER PANEL PN-8-B

CAPACITORS						METERS			151-1	1332Ω±1%	A112295-1
121-1	.005MFD.-600V	A104614-2	128	TUNING	A105268	139	0-25MA	C62063	151-2	1332Ω±1%	A112295-2
121-2	.005MFD.-600V	A104614-2	129	TUNING	[illegible]	RESISTORS			153	.57Ω±1%	A112295-4
121-3	.005MFD.-600V	A104614-2	130	TUNING	A105331	141-1	500Ω-2W	A105162-501			
121-4	.005MFD.-600V	A104614-2	131	NEUTRALIZING	A105269	141-2	500Ω-2W	A105162-501	TRANSFORMER		
122-1	.0001MFD.-1000V	A104591-1	132-1	.02MFD.-1000V	A104604	142	5000Ω-2W	A105162-502	146	FILAMENT	A27058
122-2	.0001MFD.-1000V	A104591-1	JACK			143-1	50Ω-2W	A105162-50	SOCKETS		
122-3	.0001MFD.-1000V	A104591-1	133	MON. JACK	A104574-2	143-2	50Ω-2W	A105162-50	147-1	4 CONTACT	A18168-1
122-4	.0001MFD.-1000V	A104591-1	INDUCTANCES			143-3	50Ω-2W	A105162-50	147-2	4 CONTACT	A18168-1
122-5	.0001MFD.-1000V	A104591-1	134-1	PLATE CHOKE	A105375-1	143-4	50Ω-2W	A105162-50	148	OCTAL	A18168-6
122-6	.0001MFD.-1000V	A104591-1	134-2	MON. FILTER	A105375-1	143-5	50Ω-2W	A105162-50	SWITCHES		
123-1	1.5MMFD.-1000V	A104591-3	134-3	MON. FILTER	A105375-1	144-1	14000Ω-2W	A105162-143	149	GRID METER	A105371
123-2	1.5MMFD.-1000V	A104591-3	134-4	MON. FILTER	A105375-1	144-2	14000Ω-2W	A105162-143	150	CATHODE METER	A105370
124	1MFD.-600V	A104625-1	135	GRID TANK	A104635	144-3	14000Ω-2W	A105162-143	154	METER SWITCH	C60880
125	.0005MFD.-5000V	A104195-6	136	PLATE TANK	A105235	144-4	14000Ω-2W	A105162-143	TUBES		
126-1	.0005MFD.-1000V	A104591-2	137	ANT. COUPLING	AA105288-1	145-1	3000Ω-2W	A105162-302	VT-94	MONITOR	6J5
126-2	.0005MFD.-1000V	A104591-2	138	ANT. COUPLING	AA105996-1	145-2	3000Ω-2W	A105162-302	VT-204	AMPLIFIERS	HK-24-G
127	.005MFD.-1000V	A104195-5									

OSCILLATOR PANEL PN-9-B

CAPACITORS			166-1	.002MFD.-2500V	A104195-7	INDUCTANCES			189-5	50Ω-2W	A105162-50	SOCKETS		
161-1	.005MFD.-600V	A104614-2	166-2	.002MFD.-2500V	A104195-7	159	CHOKE	AA105376-2	189-6	50Ω-2W	A105162-50	160	CRYSTAL	AC58396-1
161-2	.005MFD.-600V	A104614-2	166-3	.002MFD.-2500V	A104195-7	177	CHOKE	A105375-1	190-1	50000Ω-2W	A105162-503	197	OCTAL	A18168-6
161-3	.005MFD.-600V	A104614-2	167	TRIMMER	A105262	178	TANK	AA105373-1	190-2	50000Ω-2W	A105162-503	198	5 CONTACT	A18168-2
161-4	.005MFD.-600V	A104614-2	168-1	.0005MFD.-5000V	A104195-6	179	TANK	AA105374-1	191-1	25000Ω-2W	A105162-253	199-1	4 CONTACT	A18168-1
161-5	.005MFD.-600V	A104614-2	168-2	.0005MFD.-5000V	A104195-6	180	CHOKE	AA105376-1	191-2	25000Ω-2W	A105162-253	199-2	4 CONTACT	A18168-1
161-6	.005MFD.-600V	A104614-2	168-3	.0005MFD.-5000V	A104195-6	181	TANK	AA106372-1	192-1	1000Ω-15W	A104573-6	199-3	4 CONTACT	A18168-1
161-7	.005MFD.-600V	A104614-2	169-1	.002MFD.-500V	A104614-1	182	CHOKE	AA105377-1	192-2	1000Ω-15W	A104573-6	CRYSTAL		
161-8	.005MFD.-600V	A104614-2	169-2	.002MFD.-500V	A104614-1	183	CHOKE	AA105378-1	193-1	7500Ω-2W	A105162-752		CRYSTAL	AC58203
161-9	.005MFD.-600V	A104614-2	169-3	.002MFD.-500V	A104614-1	184	TANK	A103752	193-2	7500Ω-2W	A105162-752	TUBES		
161-10	.005MFD.-600V	A104614-2	169-4	.002MFD.-500V	A104614-1	185	TANK	A105261	194-1	5000Ω-2W	A105162-502	VT-175	OSC.	1613
162-1	.005MFD.-1000V	A104195-5	169-5	.002MFD.-500V	A104614-1	RESISTORS			194-2	5000Ω-2W	A105162-502	VT-100	1ST. TRIP	807
162-2	.005MFD.-1000V	A104195-5	169-6	.002MFD.-500V	A104614-1	158	500Ω-2W	A105162-501	195	125Ω-15W	A104573-1	VT-204	2ND. TRIP	HK-24-G
162-3	.005MFD.-1000V	A104195-5	170	TUNING	A105239	188	100000Ω-2W	A105162-104	SWITCH			VT-204	DOUBLER	HK-24-G
163-1	TUNING	A105240-1	171	TUNING	A105623	189-1	50Ω-2W	A105162-50	176	METER	A105946	VT-204	I.P.A.	HK-24-G
163-2	TUNING	A105240-1	172	TUNING	A105241	189-2	50Ω-2W	A105162-50	TRANSFORMER					
164	.002MFD.-1000V	A104195-8	173	NEUTRALIZING	A105624	189-3	50Ω-2W	A105162-50	196	FILAMENT	A27092			
165	50MMFD.-1000V	A104195-4	175	15MMFD.-500V	A18182-17	189-4	50Ω-2W	A105162-50						

MODULATOR PANEL PN-10-B

CAPACITORS			31-16	.0005MFD.-1000V	A104591-2	32-1	.0001MFD.-1000V	A104591-1	CHOKE COIL			RECTIFIER			62-5	OCTAL	A18168-6
31-1	.0005MFD.-1000V	A104591-2	31-17	.0005MFD.-1000V	A104591-2	32-2	.0001MFD.-1000V	A104591-1	43	30HENRIES-.025A	A27098	54	5V-.058 D.C.	A104500	63-1	4 PRONG	A18168-1
31-2	.0005MFD.-1000V	A104591-2	31-18	.0005MFD.-1000V	A104591-2	33-1	.002MFD.-500V	A104614-1	RESISTORS			KEY			63-2	4 PRONG	A18168-1
31-3	.0005MFD.-1000V	A104591-2	31-19	.0005MFD.-1000V	A104591-2	33-2	.002MFD.-500V	A104614-1	45-1	200Ω ½W	A104572-201	55	LEVER	A104575	TUBES		
31-4	.0005MFD.-1000V	A104591-2	31-20	.0005MFD.-1000V	A104591-2	34	.02MFD.-1000V	A104195-1	45-2	200Ω ½W	A104572-201	TRANSFORMERS			VT-94	AUDIO OSC.	6J5
31-5	.0005MFD.-1000V	A104591-2	31-21	.0005MFD.-1000V	A104591-2	35	.0045MFD.-1000V	A104195-3	46-1	10000Ω ½W	A104572-103	56	MICROPHONE	A103006	VT-175	DRIVER	1613
31-6	.0005MFD.-1000V	A104591-2	31-22	.0005MFD.-1000V	A104591-2	36-1	25MFD.-25V	A104198-1	46-2	10000Ω ½W	A104572-103	57	INTERSTAGE	A103008	VT-217	MODULATOR	811
31-7	.0005MFD.-1000V	A104591-2	31-23	.0005MFD.-1000V	A104591-2	36-2	25MFD.-25V	A104198-1	47-1	50000Ω ½W	A104572-503	58	DRIVER	A103010	VT-94	1ST. AUDIO AMP.	6J5
31-8	.0005MFD.-1000V	A104591-2	31-24	.0005MFD.-1000V	A104591-2	37	2MFD.-600V	C58338-3	47-2	50000Ω ½W	A104572-503	59	MODULATION	A103000			
31-9	.0005MFD.-1000V	A104591-2	31-24	.0005MFD.-1000V	A104591-2	38-1	4MFD.-600V	C58338-4	48	1MEGOHM-½W	A104572-105	60	FILAMENT	A27086			
31-10	.0005MFD.-1000V	A104591-2	31-25	.0005MFD.-1000V	A104591-2	38-2	4MFD.-600V	C58338-4	49	50000Ω-2W	A105162-503	61	AUDIO	A27096			
31-11	.0005MFD.-1000V	A104591-2	31-26	.0005MFD.-1000V	A104591-2	JACKS			50	500Ω-2W	A105162-501	SOCKETS					
31-12	.0005MFD.-1000V	A104591-2	31-27	.0005MFD.-1000V	A104591-2	40	MICROPHONE	A104574-1	51	325Ω 25W	A104573-2	62-1	OCTAL	A18168-6			
31-13	.0005MFD.-1000V	A104591-2	31-28	.0005MFD.-1000V	A104591-2	41	MICROPHONE	A104574-2	52	600Ω DUAL V.C.	A104577-1	62-2	OCTAL	A18168-6			
31-14	.0005MFD.-1000V	A104591-2	31-29	.0005MFD.-1000V	A104591-2	RELAY			53	15000Ω DUAL V.C.	A104577-1	62-3	OCTAL	A18168-6			
31-15	.0005MFD.-1000V	A104591-2				42	KEYING	C58361				62-4	OCTAL	A18168-6			

CONTROL PANEL PN-11-A

CAPACITORS			4-1	2AMP.-250V	A104542-3	8	PLATE CONTROL	C58363	RECTIFIER			TRANSFORMER		
1-1	20MFD.-50V	A104504	4-2	2AMP.-250V	A104542-3	CHOKE COIL			12	24V-.46A D.C.	A106056	16	RECTIFIER	A103002
1-2	20MFD.-50V	A104504	JACKS			9	15HENRIES-.08A	A103032	SWITCHES				LAMP CAPS	
1-3	20MFD.-50V	A104504	5-1	LAMP	A104502	LAMPS			13-1	MASTER FIL.	A104508		GREEN	A104503-2
1-4	20MFD.-50V	A104504	5-2	LAMP	A104502	10-1	PILOT-4V	A104501	13-2	MASTER H.V.	A104508		RED	A104503-1
FUSES			5-3	LAMP	A104502	10-2	PILOT-4V	A104501	14	TUNE-OPERATE	A104509			
2-1	5AMP.-250V	A104542-1	5-4	LAMP	A104502	10-3	PILOT-4V	A104501	15-1	R.F. FIL.	A104507			
2-2	5AMP.-250V	A104542-1	RELAYS			10-4	PILOT-4V	A104501	15-2	R.F. FIL.	A104507			
3-1	3AMP.-250V	A104542-2	6	PLATE CONTACTOR	C58343	RESISTOR			15-3	R.F. FIL.	A104507			
3-2	3AMP.-250V	A104542-2	7	SIGNAL CONTROL	C58363	11	120Ω-30W	A104505	15-4	R.F. FIL.	A104507			

POWER SUPPLY PANEL PN-12-A

CAPACITORS			98	PLATE	A103004
91	10MFD.-1500V	C58338-6	SOCKETS		
92	10MFD.-600V	C58338-5	99-1	4 PRONG	A30440
93-1	.1MFD.-600V	A104625-1	99-2	4 PRONG	A30440
93-2	.1MFD.-600V	A104625-1	99-3	4 PRONG	A30440
CHOKES			99-4	4 PRONG	A30440
94-1	11HENRIES-.27A	A27094	TUBES		
94-2	11HENRIES-.27A	A27094	VT-145	RECTIFIER	5Z3
RESISTORS					
95-1	8000Ω-90W	A104573-5			
95-2	8000Ω-90W	A104573-5			
96	1500Ω-40W	A104573-3			
TRANSFORMERS					
97	FILAMENT	A27090			

POWER CONTROL PANEL PN-13-B

FUSES		
111-1	10A-250V	A104542-4
111-2	10A-250V	A104542-4
112-1	5A-250V	A104542-1
112-2	5A-250V	A104542-1
METER		
113	0-300V A.C.	A104615
LAMP		
114	6W-150V	A104685
BULL'S EYE UNIT		
115	UNIT AND INSERT	A104684
SWITCH		
116	3P.S.T.-15A-250V	A104675
TRANSFORMER		
117	220-250V-VARIAC	C58370

POWER AMPLIFIER PANEL PN-8-B

			METERS		151-1	1.332ω±1%	A112295-1
G	A105268	139	0-25MA	C62063	151-2	1.332ω±1%	A112295-2
S	[illegible]		RESISTORS		153	.57ω±1%	A112295-4
G	A105331	141-1	500ω-2W	A105162-501			
LIZING	A105269	141-2	500ω-2W	A105162-501		TRANSFORMER	
-1000V	A104604	142	5000ω-2W	A105162-502	146	FILAMENT	A27088
K		143-1	50ω-2W	A105162-50		SOCKETS	
ACK	A104574-2	143-2	50ω-2W	A105162-50	147-1	4 CONTACT	A18168-1
TANCES		143-3	50ω-2W	A105162-50	147-2	4 CONTACT	A18168-1
CHOKE	A105375-1	143-4	50ω-2W	A105162-50	148	OCTAL	A18168-6
ILTER	A105375-1	143-5	50ω-2W	A105162-50		SWITCHES	
LTER	A105375-1	144-1	14000ω-2W	A105162-143	149	GRID METER	A105371
LTER	A105375-1	144-2	14000ω-2W	A105162-143	150	CATHODE METER	A105370
ANK	A104635	144-3	14000ω-2W	A105162-143	154	METER SWITCH	C60880
TANK	A105235	144-4	14000ω-2W	A105162-143		TUBES	
IPLING	AA105288-1	145-1	3000ω-2W	A105162-302	VT-94	MONITOR	6J5
PLING	AA105996-1	145-2	3000ω-2W	A105162-302	VT-204	AMPLIFIERS	HK-24-G

OSCILLATOR PANEL PN-9-B

D.-2500V	A104195-7		INDUCTANCES		189-5	50ω-2W	A105162-50		SOCKETS	
-2500V	A104195-7	159	CHOKE	AA105376-2	189-6	50ω-2W	A105162-50	160	CRYSTAL	AC58396-1
-2500V	A104195-7	177	CHOKE	A105375-1	190-1	50000ω-2W	A105162-503	197	OCTAL	A18168-6
ER	A105262	178	TANK	AA105373-1	190-2	50000ω-2W	A105162-503	198	5 CONTACT	A18168-2
D.-5000V	A104195-6	179	TANK	AA105374-1	191-1	25000ω-2W	A105162-253	199-1	4 CONTACT	A18168-1
-5000V	A104195-6	180	CHOKE	AA105376-1	191-2	25000ω-2W	A105162-253	199-2	4 CONTACT	A18168-1
-5000V	A104195-6	181	TANK	AA105372-1	192-1	1000ω-15W	A104573-6	199-3	4 CONTACT	A18168-1
D.-500V	A104614-1	182	CHOKE	AA105377-1	192-2	1000ω-15W	A104573-6		CRYSTAL	
.-500V	A104614-1	183	CHOKE	AA105378-1	193-1	7500ω-2W	A105162-752		CRYSTAL	AC58203
-500V	A104614-1	184	TANK	A103752	193-2	7500ω-2W	A105162-752		TUBES	
-500V	A104614-1	185	TANK	A105261	194-1	5000ω-2W	A105162-502	VT-175	OSC.	1613
-500V	A104614-1		RESISTORS		194-2	5000ω-2W	A105162-502	VT-100	1ST. TRIP	807
-500V	A104614-1	158	500ω-2W	A105162-501	195	125ω-15W	A104573-1	VT-204	2ND. TRIP	HK-24-G
VG	A105239	188	100000ω-2W	A105162-104		SWITCH		VT-204	DOUBLER	HK-24-G
G	A105623	189-1	50ω-2W	A105162-50	176	METER	A105946	VT-204	I.P.A.	HK-24-G
VG	A105241	189-2	50ω-2W	A105162-50		TRANSFORMER				
ALIZING	A105624	189-3	50ω-2W	A105162-50	196	FILAMENT	A27092			
D.-500V	A18182-17	189-4	50ω-2W	A105162-50						

MODULATOR PANEL PN-10-B

D.-1000V	A104591-2	32-1	.0001 MFD.-1000V	A104591-1		CHOKE COIL			RECTIFIER		62-5	OCTAL	A18168-6
D.-1000V	A104591-2	32-2	.0001 MFD.-1000V	A104591-1	43	30HENRIES-.025A	A27098	54	5V-.058 D.C.	A104500	63-1	4 PRONG	A18168-1
.-1000V	A104591-2	33-1	.002 MFD.-500V	A104614-1		RESISTORS			KEY		63-2	4 PRONG	A18168-1
D.-1000V	A104591-2	33-2	.002 MFD.-500V	A104614-1	45-1	200ω ½W	A104572-201	55	LEVER	A104575		TUBES	
D.-1000V	A104591-2	34	.02 MFD.-1000V	A104195-1	45-2	200ω ½W	A104572-201		TRANSFORMERS		VT-94	AUDIO OSC.	6J5
D.-1000V	A104591-2	35	.0045MFD.-1000V	A104195-3	46-1	10000ω ½W	A104572-103	56	MICROPHONE	A103006	VT-175	DRIVER	1613
D.-1000V	A104591-2	36-1	25MFD.-25V	A104198-1	46-2	10000ω ½W	A104572-103	57	INTERSTAGE	A103008	VT-217	MODULATOR	811
D.-1000V	A104591-2	36-2	25MFD.-25V	A104198-1	47-1	50000ω ½W	A104572-503	58	DRIVER	A103010	VT-94	1ST. AUDIO AMP.	6J5
D.-1000V	A104591-2	37	2MFD.-600V	C58338-3	47-2	50000ω ½W	A104572-503	59	MODULATION	A103000			
D.-1000V	A104591-2	38-1	4MFD.-600V	C58338-4	48	1 MEGOHM-½W	A104572-105	60	FILAMENT	A27086			
D.-1000V	A104591-2	38-2	4MFD.-600V	C58338-4	49	50000ω-2W	A105162-503	61	AUDIO	A27096			
D.-1000V	A104591-2		JACKS		50	500ω-2W	A105162-501		SOCKETS				
D.-1000V	A104591-2	40	MICROPHONE	A104574-1	51	325ω 25W	A104573-2	62-1	OCTAL	A18168-6			
.-1000V	A104591-2	41	MICROPHONE	A104574-2	52	600ω DUAL V.C.	A104577-1	62-2	OCTAL	A18168-6			
D.-1000V	A104591-2		RELAY		53	15000ω DUAL V.C.	A104577-1	62-3	OCTAL	A18168-6			
		42	KEYING	C58361				62-4	OCTAL	A18168-6			

CONTROL PANEL PN-11-A

-250V	A104542-3	8	PLATE CONTROL	C58363		RECTIFIER			TRANSFORMER	
-250V	A104542-3		CHOKE COIL		12	24V-46A D.C.	A106056	16	RECTIFIER	A103002
CKS		9	15HENRIES-.08A	A103032		SWITCHES			LAMP CAPS	
	A104502		LAMPS		13-1	MASTER FIL.	A104508		GREEN	A104503-2
	A104502	10-1	PILOT-4V	A104501	13-2	MASTER H.V.	A104508		RED	A104503-1
	A104502	10-2	PILOT-4V	A104501	14	TUNE-OPERATE	A104509			
	A104502	10-3	PILOT-4V	A104501	15-1	R.F. FIL.	A104507			
AYS		10-4	PILOT-4V	A104501	15-2	R.F. FIL.	A104507			
CONTACTOR	C58343		RESISTOR		15-3	R.F. FIL.	A104507			
CONTROL	C58363	11	120ω-30W	A104505	15-4	R.F. FIL.	A104507			

POWER SUPPLY PANEL PN-12-A

	A103004
CETS	
NG	A30440
VG	A30440
VG	A30440
VG	A30440
ES	
IER	5Z3

POWER CONTROL PANEL PN-13-B

INTERPANEL SCHEMATIC DIAGRAM RADIO TRANSMITTER BC-640-B

PRELIMINARY MAINTENANCE INSTRUCTIONS

FOR

RADIO TRANSMITTER BC-640-A

RESTRICTED

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SPECIAL NOTICE

THE MOST COMMON FAULT WITH FIELD COMMUNICATION EQUIPMENT IS LOOSE OR FAULTY CONNECTIONS IN EXTERNAL WIRING. LOOK FIRST FOR THIS. THE SECOND MOST COMMON REPAIR NECESSARY IS THAT DUE TO MISADJUSTMENTS BY UNQUALIFIED OPERATING PERSONNEL. THERE ARE ALMOST NO INTERNAL ADJUSTMENTS OR REPAIRS OPERATING PERSONNEL SHOULD BE PERMITTED TO DO ON THESE UNITS. USE THE SPARE UNITS WHERE AVAILABLE AND SEND FOR YOUR EXPERIENCED REPAIRMAN. HIS EXPERIENCE AND EQUIPMENT WILL INVARIABLY SAVE THE EXTRA TIME.

A FEW INDISCRIMINATE INTERNAL ADJUSTMENTS ON EQUIPMENT OPERATING IN THESE FREQUENCIES MAY NECESSITATE A FACTORY REPAIR JOB WHERE A SIMPLE REPAIR JOB WOULD HAVE BEEN SUFFICIENT.

TABLE OF CONTENTS

Par. *Page*

SECTION I—FUNCTIONING OF PARTS

1. General 1
2. Power Control Panel PN-13-A 1
3. Power Supply Panel PN-12-A 1
4. Control Panel PN-11-A 2
5. Modulator Panel PN-10-A 3
6. Oscillator Panel PN-9-A 4
7. Amplifier Panel PN-8-A 5

SECTION II—SERVICING AND REPAIR

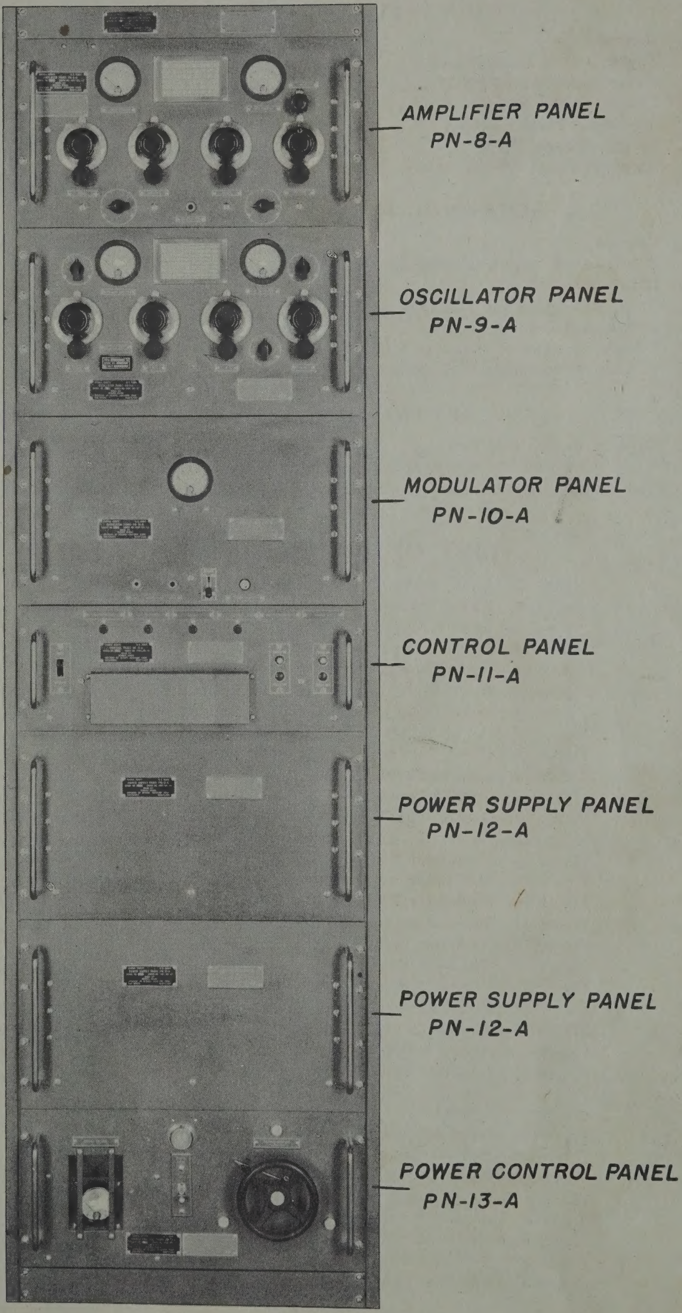
8. General 7
9. Routine Inspection and Overhaul 7
10. Lubrication 7
11. Trouble Location and Remedy 7
12. Operational Trouble Analysis 7
13. Trouble Analysis by Means of Voltage Tests 11
14. Vacuum Tube Socket Voltages and Resistances 14

SECTION III—APPENDIX

15. Table of Replaceable Parts 19
16. RMA Color Code for Resistors and Capacitors 35
17. Addresses of Manufacturers 37

LIST OF ILLUSTRATIONS

Figure 1—Radio Transmitter BC-640-A, Front View
Figure 2—Radio Transmitter BC-640-A, Rear View
Figure 3—Radio Transmitter BC-640-A, Rear View, Door Open
Figure 4—Power Control Panel PN-13-A, Front View
Figure 5—Power Control Panel PN-13-A, Interior View
Figure 6—Power Supply Panel PN-12-A, Front View
Figure 7—Power Supply Panel PN-12-A, Rear View
Figure 8—Power Supply Panel PN-12-A, Top View
Figure 9—Power Supply Panel PN-12-A, Bottom View
Figure 10—Control Panel PN-11-A, Front View
Figure 11—Control Panel PN-11-A, Rear View
Figure 12—Control Panel PN-11-A, Top View
Figure 13—Control Panel PN-11-A, Bottom View
Figure 14—Modulator Panel PN-10-A, Front View
Figure 15—Modulator Panel PN-10-A, Rear View
Figure 16—Modulator Panel PN-10-A, Top View
Figure 17—Modulator Panel PN-10-A, Bottom View
Figure 18—Oscillator Panel PN-9-A, Front View
Figure 19—Oscillator Panel PN-9-A, Rear View
Figure 20—Oscillator Panel PN-9-A, Top View
Figure 21—Oscillator Panel PN-9-A, Bottom View
Figure 22—Amplifier Panel PN-8-A, Front View
Figure 23—Amplifier Panel PN-8-A, Rear View
Figure 24—Amplifier Panel PN-8-A, Top View
Figure 25—Amplifier Panel PN-8-A, Bottom View With Cover On
Figure 26—Amplifier Panel PN-8-A, Bottom View With Cover Off
Figure 27—Amplifier Panel PN-8-A, Left Side View
Figure 28—Radio Transmitter BC-640-A, Interpanel Wiring Diagram
Figure 29—Power Control Panel PN-13-A, Schematic Diagram
Figure 30—Power Supply Panel PN-12-A, Schematic Diagram
Figure 31—Control Panel PN-11-A, Schematic Diagram
Figure 32—Modulator Panel PN-10-A, Schematic Diagram
Figure 33—Oscillator Panel PN-9-A, Schematic Diagram
Figure 34—Amplifier Panel PN-8-A, Schematic Diagram


AMPLIFIER PANEL
PN-8-A
OSCILLATOR PANEL
PN-9-A
MODULATOR PANEL
PN-10-A
CONTROL PANEL
PN-11-A
POWER SUPPLY PANEL
PN-12-A
POWER SUPPLY PANEL
PN-12-A
POWER CONTROL PANEL
PN-13-A

2906

FIGURE 1—RADIO TRANSMITTER BC-640-A, FRONT VIEW

PRELIMINARY MAINTENANCE INSTRUCTIONS

for

RADIO TRANSMITTER BC-640-A

SECTION I—FUNCTIONING OF PARTS

1. GENERAL

Detailed operating instructions and a physical description of Radio Transmitter BC-640-A are given in Temporary Instructions for Radio Transmitter BC-640-A. The following deals with the operation of the various components and circuits of the equipment. When necessary, refer to the above-mentioned Temporary Instructions, because operating and descriptive information included therein will not be repeated here. A complete schematic circuit diagram, Bendix Drawing No. R95743, is provided in one of the five rear-door compartments of Cabinet CS-88-A. Schematic circuit diagrams of the individual components of the transmitter are included in this book.

Begin the circuit analysis with Power Control Panel PN-13-A, (the lowest panel in the transmitter), and cover the remaining panels in successive order, ending with Amplifier Panel PN-8-A.

2. POWER CONTROL PANEL PN-13-A

The power-input connections are made to the 110/125-volt terminals of the cabinet terminal board. The input-power is then applied to terminals 1 and 2 on Power Control Panel PN-13-A, through fuses 111-1 and 111-2, through the two right-hand blades (facing the rear of the switch) of POWER MAINS switch 116 to terminals 8 and 9 of the power control panel, and finally to terminals 2 and 3 of the auto-transformer. The sole function of this auto-transformer is to increase the line voltage to 220–250 volts. When the transmitter is connected to a 220–250-volt line, the auto-transformer performs no function whatever, even though it is connected across the line and consumes approximately 5.5 watts. With 110-125 volts applied to terminals 2 and 3 of the auto-transformer, 220–250 volts will appear across terminals 1 and 3 which are in turn connected to terminals 7 and 9 of Power Control Panel PN-13-A. Terminals 7 and 9 are connected to the 220–250-volt line terminals on the variable-ratio transformer 117. This transformer provides the operating potential of 230 volts, the voltage being controlled by the movable tap. The transmitter circuits, which are connected to terminals 5 and 6 of the power control panel, are thus connected across the tap and the bottom terminal of the variable-ratio transformer 117.

When the transmitter is supplied by a 220–250 volt line, the line connections are made to the 220–250 volt terminals on the cabinet terminal board. The input power is then fed through terminals 3 and 4 of the power control panel, fuses 112-1 and 112-2, the outside blades of POWER MAINS switch 116, to the 220–250 volt line connections on the variable-ratio transformer 117. The 0–300-volt OUTPUT VOLTAGE meter 113 is connected directly across the load circuit at terminals 5 and 6 and measures the voltage supplied to the transmitter components. Meter 113 is provided with a red line at the 230-volt calibration division and the voltage is maintained at this value by varying the position of the tap on variable-ratio transformer 117. Pilot lamp 114 is connected between the bottom connection and a 125-volt tap on transformer 117.

3. POWER SUPPLY PANEL PN-12-A

Two Power Supply Panels PN-12-A are provided. These panels are identical. The lower one supplies plate power to the radio-frequency (PN-8-A & PN-9-A) portion of the transmitter and the upper one supplies plate power to the modulator (PN-10-A) portion.

The filament transformer (97) is energized by 230 volts a-c through terminals 4 and 5 of the power supply panel. The filament-transformer primary in each power supply panel is connected in parallel with the filament transformer in the particular panel which is being operated. The filaments of the panel being operated are turned on simultaneously with the corresponding power supply.

The plate transformer (98) is energized by 230 volts a-c applied to primary terminals 2 and 3. If the a-c

Tube VT-175 (1613) and VT-66 (6F6) are practically alike and are interchangeable in this equipment without affecting performance.

D-12274

potential of 230 volts is applied across the primary terminals 1 and 3 instead of 2 and 3, the resulting plate voltage is one-half of normal. This connection is used only in the lower power supply panel and provides one-half of normal plate voltage for tuning the transmitter.

Both the filament and the plate transformer of Power Supply Panel PN-12-A are provided with 4-volt windings which are connected through the terminal board to indicator lamps on Control Panel PN-11-A. These lamps indicate when filament and plate power is on.

The power supply panel is provided with a bridge circuit for rectification. This circuit is arranged to resemble two full-wave center-tapped transformer-type rectifiers in series with the center tap connected to the 395-volt tap on the voltage divider. The 395-volt tap is connected to terminal 16. The bridge circuit is used to supply 800 volts to terminal 17. This arrangement of dividing the circuit provides better voltage regulation on the 395-volt tap. The 315-volt tap is connected to terminal 15 and the negative ground is connected to terminal 14. Choke 94-1 is employed in the 800-volt circuit and choke 94-2 is used in the 395-volt circuit.

4. CONTROL PANEL PN-11-A

The 230-volt a-c supply from the load terminals of Power Control Panel PN-13-A is connected to terminals 1 and 2 of Control Panel PN-11-A. The circuit continues through fuses 2-1 and 2-2, the MASTER FILAMENT switch (13-1) to the MASTER H. V. switch (13-2). This circuit also branches off through fuses 4-1 and 4-2 to the R.F. FILAMENT switch (15-1) and the A.F. FILAMENT switch (15-2). After passing through switch 15-1 the circuit continues through terminals 11 and 12 to the filament transformers of the r-f panels and their respective power supplies. After passing through switch 15-2 and terminals 13 and 14 the circuit continues to the filament transformers of Modulator Panel PN-10-A and its power supply.

The 230-volt a-c circuit continues through the MASTER H.V. switch (13-2,) the contacts of plate contactor 6, the R.F.H.V. switch (15-3) through the TUNE-OPERATE switch (14) and terminals 16 and 17 to the plate transformer of the lower Power Supply Panel PN-12-A. If the TUNE-OPERATE switch (14) is at TUNE, the a-c potential of 230-volts is supplied to the plate transformer through terminals 15 and 17 and half the normal voltage is applied to the tube anodes. The 230-volt a-c circuit also continues through 3-2 and 3-1, through the A.F.H.V. switch (15-4) and terminals 19 and 20 to the primary of the plate transformer in the upper Power Supply Panel PN-12-A.

The high-voltage power-supply circuit will be open at the contacts of the plate contactor 6, unless the coil of this contactor is energized. The contactor coil circuit begins at the coil and connects to the left side of the 230-volt a-c line between the MASTER H.V. switch (13-2) and the plate contactor contacts. The circuit continues through coil 6, terminal 26, the door interlock switch at the side of the cabinet (therefore, for the plate contactor to operate, the cabinet door must be closed), back to Control Panel PN-11-A through terminal 25 and through a pair of contacts on plate-control relay 8 to the other side of the 230-volt a-c line. Plate-control relay 8 is closed when energized. Operation of this relay will be described later.

Returning to the load side of the MASTER FILAMENT switch (13-1) the 230-volt a-c line connects to terminals 1 and 2 of transformer 16. This step-down transformer supplies current for operation of relays 7 and 8, the microphones, and the signal lamps in the control units of the SCS-2 V.H.F. Aircraft Control System. The transformer secondary output is rectified by the metallic bridge rectifier 12. The unfiltered output of the rectifier is connected to terminals 21 and 22 through the contacts of signal control relay 7. Note that when the coil of this relay is energized, the contacts are opened. Terminals 21 and 22 connect to the signal lamp circuit of the control units in the SCS-2 V.H.F. Aircraft Control System. Thus, when the coil of the signal control relay 7 is energized, no current is available to light the TRANSMITTER AVAILABLE lamps in the control units.

Capacitors 1-1 and 1-2 and choke 9 are the filter components for the microphone current supply. Capacitors 1-3 and 1-4 are filters used to prevent the plate-control relay 8 from chattering due to the variation of the microphone current flowing through its coil. These capacitors are in the circuit only when plate-control relay 8 is operated, thus closing the contacts in series with these capacitors. Resistor 11 is the load-stabilizing resistor for the rectifier unit.

Beginning at the positive side of the rectifier, the microphone circuit passes through filter choke 9, through the coil of plate-control relay 8, through terminal 24 to the inside connection of the coils of the split primary of the microphone transformer 56 in the modulator (PN-10-A), through the microphone transformer primary, to Control Panel PN-11-A, through terminal 23 and through the coil of signal-control relay 7 to the minus side of the rectifier.

Whenever a microphone, either local or remote, is connected into the circuit, current will flow through the coils of plate-control relay 8 and signal-control relay 7, thus energizing these relays and operating their contacts. Setting the REMOTE-LOCAL switch on Modulator Panel PN-10-A at LOCAL switches the local microphone into the circuit and permits both relays to operate, whether or not there is a microphone in the MIC. jack on Modulator Panel PN-10-A as this is a closed-circuit jack. Operation of plate-control relay 8 energizes the plate contactor and places the transmitter in operation only if the high-voltage and filament switches are on. Operation of signal-control relay 7 opens the TRANSMITTER AVAILABLE signal lamp circuits of the control units and thereby indicates that the transmitter is not available for remote operation. When the LOCAL-REMOTE switch on Modulator Panel PN-10-A is set at REMOTE, signal-control relay 7 is inoperative by short-circuiting the relay coil through terminals 21 and 23. This completes the TRANSMITTER AVAILABLE signal-lamp circuit from the rectifier through the contacts of relay 8 through terminals 21 and 22.

Lamp 5-1 is connected to a four-volt secondary winding of filament transformer 97 of the Power Supply Panel PN-12-A supplying modulator plate power. Lamp 5-1 is provided with a green cap and indicates that the modulator amplifier and rectifier tube filaments are on. Lamp 5-2 is connected to a four-volt secondary winding on the filament transformer of Power Supply Panel PN-12-A which supplies the r-f portion of the transmitter with plate power. This lamp is provided with a green cap and indicates that the r-f amplifier, oscillator and rectifier tube-filaments are on. Lamp 5-3 is connected to a four-volt secondary winding on the plate transformer (98) of Power Supply Panel PN-12-A which supplies modulator plate power. It has a red cap and indicates that the modulator panel is supplied with plate power. Lamp 5-4 is connected to a four-volt secondary winding on the plate transformer (98) in Power Supply Panel PN-12-A and supplies the r-f portion of the transmitter with plate voltage. It has a red cap and indicates that the r-f panels are supplied with plate power.

5. MODULATOR PANEL PN-10-A

a. The 230-volt a-c circuit from Control Panel PN-11-A enters the modulator panel through terminals 4 and 5 and is connected to the primary of filament transformer 60. Transformer 60 has three secondary windings. The winding connected between transformer terminals 8 and 9 supplies voltage for operating relay 42 and filament power for the first amplifier stage and the audio oscillator. The winding connected between transformer terminals 3 and 4 supplies filament power to the driver stage, and the winding connected between transformer terminals 5 and 6 supplies filament power to the power output or modulator stage. A 0–200 milliammeter 44 is connected in series with the center tap of this winding and ground and indicates the cathode current of both tubes. Tubes VT-217 are zero-bias Class B output tubes.

b. Two local microphone jacks (40 and 41) are provided for two sizes of microphone plugs. These jacks are wired in series, but since they are closed-circuit jacks, the one not in use is short circuited by its own contacts.

c. The LOCAL-REMOTE switch (55) is shown set at REMOTE or in normal position on the schematic circuit diagram. Operating the moving blades (in the direction indicated by the arrow near the switch) will set the switch at LOCAL.

d. With switch 55 set at REMOTE the local microphone jacks 40 and 41 are not connected in the circuit. Terminals 1 and 6 of the primary of the microphone transformer 56 are connected to the remote line through terminals 13 and 14 on the modulator panel and terminals 36 and 37 on the cabinet terminal board. Terminal 16 is connected to ground, thereby short-circuiting the coil of signal-control relay 7 in Control Panel PN-11-A.

(1) When LOCAL-REMOTE switch (55) is set at LOCAL, the local microphone jacks 40 and 41 are connected to terminals 2 and 5 on the primary of microphone transformer 56. The remote line and terminals 1 and 6 of the transformer are disconnected, and the short circuit is taken off the signal-control relay in the control panel, thus allowing the relay to operate and disconnect the circuit of the TRANSMITTER AVAILABLE lamps in the control units.

(2) The secondary of the microphone transformer is connected to the grids of the first push-pull audio-amplifier stages through volume control 53A and B and parasitic suppressing resistors 46-1 and 2. The center-tap is connected to ground. Grid bias

for this stage is obtained by the use of cathode-bias resistor 50.

(3) The plates of the two tubes in this stage are connected to the primary of the push-pull interstage transformer 57 in the conventional manner. The center-tap of the primary is connected directly to the high voltage source through terminal 7 and filter choke 43. This choke, in conjunction with filter capacitors 38-1 and 38-2, comprises a pi filter.

(4) The secondary of interstage transformer 57 is loaded by resistors 47-1 and 47-2 and is connected to the grids of the push-pull driver stage in the conventional manner. The center-tap is connected to ground. Grid bias is obtained by means of cathode resistor 51. The driver stage utilizes pentode-type tubes which are connected as triodes to reduce the a-c plate resistance, thus reducing the distortion resulting from driving the class B modulators. The plates are connected to the primary of the driver transformer 58 in the conventional manner. The center-tap is connected to the high-voltage source through terminal 7. The secondary of the driver transformer is connected to the class B modulator grids. The center-tap is connected to ground. These modulator tubes need no grid bias. The plates are connected to the primary of the modulation transformer 59, the center-tap of which is connected to 800 volts through terminal 17. The secondary of the modulation transformer is connected in series with the plate supply to the r-f power amplifier tubes through terminals 18 and 19.

Tube VT-94 in socket 62-5 is the audio oscillator. This tube is connected to form a Hartley oscillator circuit using the coil between terminals 1 and 3 of transformer 61. The resonant frequency is approximately 1000 cycles per second and the oscillator output appears across the coil between terminals 4 and 5 of transformer 61. The output of the audio oscillator is connected across the secondary of the microphone transformer through the contacts of relay 42 and the audio oscillator volume control 52A and B. The contacts on relay 42 are closed when the coil is energized. The audio oscillator signal passes through the modulator amplifiers and modulates the final r-f power amplifier in the same manner as speech signals.

Note that the audio oscillator is continually in operation, but that its output is not used until relay 42 is operated. The current to operate relay 42 originates from the same filament winding on the filament transformer which operates the audio oscillator tube. In tracing the circuit of this relay coil, assume that there is a direct connection between terminals 11 and 12 on Modulator Panel PN-10-A. Beginning at terminal 11 which is connected to one side of the filament supply, the circuit continues through terminals 11 and 12, the coil of relay 42 and the half-wave metallic rectifier 54 to the other side of the filament supply. The rectifier is used to supply relay 42 with direct current, and capacitors 36-1 and 36-2 filter this circuit. Therefore, if a telegraph key is inserted between terminals 11 and 12, closing the telegraph key will operate the relay 42 and will key the output of the audio oscillator in accordance with the keying operation.

6. OSCILLATOR PANEL PN-9-A

The 230-volt a-c circuit which supplies filament power for Oscillator Panel PN-9-A is connected to the primary of filament transformer 196 through terminals 4 and 5. There are four secondary windings on this transformer. A separate winding is used for each of the filament-type tubes. This is necessary since the cathode current of each tube must be metered and cathode bias is used on some of the tubes.

The oscillator is a conventional pentode crystal oscillator. Resistor 189-1 is not a cathode bias resistor, but a shunt for meter 187. Capacitor 164 is used to enable the oscillator to track with the first tripler, since the tuning (oscillator and 1st tripler) capacitors are ganged. The input to the grid of the first tripler is tapped down on the oscillator plate coil. Since the first tripler is a beam-power type tube and has a low-impedance grid circuit only a small amount of grid drive is necessary. The screen and plate supply are connected to the 315-volt terminal on Power Supply Panel PN-12-A through terminals 12 and 13 on the oscillator panel.

The first tripler Tube VT-100 in socket 198 uses a combination of grid leak and cathode bias provided by grid leak 191-1 and cathode resistor 192-1. Resistor 189-2 is the cathode-current meter shunt. The supply side of grid-dropping resistor 190-2 is connected to the 315-volt supply through terminal 13. Capacitor 163-2 is the first tripler tuning capacitor and is ganged with the oscillator tuning capacitor. 167 is the trimmer capacitor used to accurately align the oscillator and first tripler circuits. This trimmer is controlled from the front panel. The plate circuit is series fed and is operated at 395 volts through terminal 14.

The second tripler Tube VT-204 in socket 199-1 also employs a combination of grid leak and cathode bias. 180 is the grid choke and resistor 191-2 is the grid leak. Cathode bias is provided by resistor 192-2. Resistor 189-3 is the shunt for cathode-current meter 187. The plate circuit of the second tripler is shunt fed. 182 is the shunt feed choke and 166-3 is the plate-blocking capacitor. Capacitor 170 and inductor 181 comprise the tuned plate circuit. The grid of the following doubler Tube VT-204 in socket 199-2 is connected directly to the tuned plate circuit of the second tripler. Resistors 193-1 and 193-2 in series form the grid leak resistor of the doubler. Two resistors are used in series to provide increased power dissipation.

The doubler tube in socket 199-2 does not employ cathode bias. Resistor 189-4 is the meter shunt for cathode-current meter 187. The plate circuit of the doubler is shunt fed. 183 is the plate-feed choke and 168-2 is the blocking capacitor. The plate is coupled to a balanced load circuit. The tuned circuit is designed to effectively reduce the combined load effect of the doubler plate and the I.P.A. grid. The plate of the doubler is supplied by 395 volts through the plate-feed choke 183 and terminal 16.

The I.P.A. Tube VT-204 in socket 199-3 employs both cathode and grid-leak bias. Resistors 194-1 and 194-2 comprise the grid leak, and 195 is the cathode bias resistor. Resistor 189-5 is the cathode-current meter shunt. The grid current of the I.P.A. tube is indicated continuously by the I.P.A. grid-current meter 186. The plate circuit is series fed and consists of a line-type tank circuit 185 tuned by variable capacitor 172. This circuit is also balanced to provide neutralization for the I.P.A. tube through neutralizing capacitor 173. The tuned line 185 is so located above the chassis that it is inductively coupled to the tuned grid line of Amplifier Panel PN-8-A located just above it. This eliminates the necessity of providing additional link or capacity coupling. The r-f chokes (177 and 159) are provided to enable the plate line to assume perfect balance. 158 is a parasitic suppressor resistor. The plate is supplied by 800 volts from Power Supply Panel PN-12-A through terminal 17. A link is provided to remove the I.P.A. plate voltage when neutralizing. This neutralizing link is located on the rear of the chassis.

7. AMPLIFIER PANEL PN-8-A

The filament transformer 146 is supplied with 230 volts a-c from Control Panel PN-11-A through terminals 4 and 5 on Amplifier Panel PN-8-A. Three secondary windings are provided on this filament transformer, one for each of the two power-amplifier tubes and one for the monitor rectifier. The two windings for the power-amplifier filaments are center-tapped, these center-taps being connected to ground through the shunts for the cathode-current meter 140. No cathode bias is provided for these tubes. The monitor rectifier Tube VT-94 is an indirectly-heated type of tube.

The grid circuit of power amplifier Tube VT-204 is tuned by means of the tuned line circuit 135. This line is tuned by a variable capacitor 128 and receives its exciting energy by inductive coupling from the plate circuit of the I.P.A. tube. This grid line employs a comparatively large capacitor (127) to short circuit the line at the low potential end. This is done so that there will be an effective short circuit for radio frequencies while still allowing separate direct current grid circuits. A large capacitor is used because at this end of the line the impedance is very low.

The separation of the d-c circuits of the two power-amplifier grids enables the grid current of each tube to be read separately and independently. Resistors 145-1, 145-2, and 144-1 to 144-4 inclusive provide the grid-leak resistance. The use of this number of resistors increases the power-dissipation ability of the grid leak and, in conjunction with capacitors 126-1 and 126-2 serves to suppress stray r-f energy. Resistors 143-3 and -4 are the meter shunts for grid-current meter 139.

Power amplifier Tube VT-204 is plate neutralized by ganged capacitors 131A and B which are operated from the front panel. The amplifier plate also employs a tuned line for the tank circuit and is tuned by a special concentric capacitor which has a large ratio of maximum to minimum capacitance combined with a very low minimum capacitance. A large minimum capacitance here would offset the advantage gained by the use of a tuned-line plate circuit. The low-potential end of the line is connected to 800 volts from Power Supply Panel PN-12-A through terminal 17, the neutralizing link, and choke (134-1). A parasitic-suppressor resistor 141-2 is used across the plate-feed choke. The neutralizing link is accessible at the rear of the chassis.

The antenna coupling and tuning circuit employs a tuned line (137 and 138), which is inductively coupled to the plate line. Thus, the same inductance serves to couple the antenna to the amplifier and also to tune the antenna circuit. The line is tuned by capacitor 130.

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FUNCTIONING OF PARTS

The antenna connection itself is tapped to the antenna-tuning line at a point approximately equal to the impedance of the transmission line feeding the antenna. The wire with which this tap is made is also inductively coupled to the antenna-tuning circuit. This design, however, is based on experience and is used because of its success in coupling the transmitter to a variety of transmission-line impedances.

A diode-type monitor Tube VT-94 is used for demodulation of the radio-frequency output of the transmitter at the antenna transmission-line input. This permits checking the operation of the transmitter. The monitor tube, which is a metal type triode connected as a diode, is coupled to the center wire of the antenna transmission line through capacitors 123-1 and 123-2. Two capacitors are used in series to reduce the effective capacity. The r-f is kept out of the audio portion of the circuit by a network of r-f chokes (134-2,-3 and -4) and filter capacitors (122-3,-4,-5 and -6). As the plate is made positive on the positive half of the r-f cycle, current flows from the cathode of Tube VT-94 in socket 146, through chokes 134-2 and 134-3, monitor-current meter shunt 143-5, the diode load-resistor 141-1, and choke 134-4 back to the cathode. The diode current is read on grid-current meter 139 by rotating the switch 149 to the correct position. The monitor output appears across the diode load-resistor 141-1, and this output is connected at the terminal strip to terminals 9 and 10 through blocking capacitor 124. These terminals are wired to the cabinet terminal-board terminals 38 and 39 for connection to the external circuit. The monitor output is also connected to the monitor jack 133 on the front panel through isolating resistor 142.

SECTION II—SERVICING AND REPAIR

8. GENERAL

Before removing a panel from Radio Transmitter BC-640-A, determine the cause of failure and isolate the particular faulty component or circuit of the equipment. LOOK FOR THE SIMPLE CAUSES OF TROUBLE FIRST!

Innumerable defects can and may develop in a complex piece of radio equipment. Remember that time can always be saved by analyzing the *cause* of trouble and *localizing* it to a particular sub-assembly or component.

Study the complete schematic circuit diagram and mentally tabulate the various *possible* causes of failure. When the identity of the defective unit is established beyond a reasonable doubt, remove and repair it or replace it with a good unit.

9. ROUTINE INSPECTION AND OVERHAUL

a. Inspect all nuts, bolts, and screws for tightness.

b. Remove loose solder, dirt, and metallic chips.

c. Clean equipment thoroughly. Remove all traces of corrosion.

d. Inspect wiring and soldered joints. If necessary, clean plug connectors.

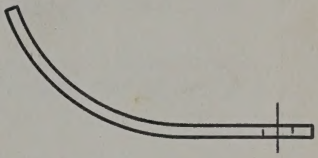
e. Do not disturb coils or alignment adjustments while making inspection.

f. Check tubes, using Supreme Tube Tester Model 504-A where applicable. Replace defective tubes.

g. Check tuning capacitors for dirt or bent plates. *Do not lubricate* before consulting Paragraph 10. If an air hose is used to blow dust and dirt from the cabinet, *make certain that the compressed air supply is free from water and that the pressure is not great enough to bend the capacitor plates.*

h. Inspect contactor 6. If the contactor emits a buzzing sound, drop the line voltage to about 90 volts. The contactor is operating satisfactorily if it drops out at approximately 90 volts.

i. Inspect the flexible antenna coupling strip on the top of Amplifier Panel PN-8-A. If this strip is broken, replace with a new one. Break about 3/4 inch of the end of the old strip and place this section on top of the new strip. Bend the end of this section slightly upward, as shown below:



10. LUBRICATION

a. With the exception of the tuning capacitor marked ANODE on Amplifier Panel PN-8-A, DO NOT LUBRICATE switches, trimmers, or variable capacitors. Lubricate tuning capacitor, when necessary, as follows:

(1) Wipe vertical guide pins clean.

(2) Grease with vaseline and wipe clean again.

b. All other movable parts are sufficiently lubricated for the lifetime of the equipment. However, if careful inspection reveals lubrication is necessary, use Royco No. 6A grease or equal very sparingly. DO NOT ALLOW grease to get on any tuned circuit component of the transmitter.

11. TROUBLE LOCATION AND REMEDY

If the transmitter has been properly tuned up as directed in Temporary Instructions for Radio Transmitter BC-640-A, and proper performance is not obtained, check the tuning very carefully. If certain that there has been no error and that all special warnings accompanying tuning instructions have been observed, carefully inspect the equipment as in Paragraph 9. If the source of trouble is still not revealed, follow the trouble shooting tables in Paragraphs 12 and 13. These tables attempt to simplify the problem of locating faulty circuits and components through a number of visual and electrical tests which makes it possible to eliminate all but one portion of the transmitter as the most likely source of trouble.

12. OPERATIONAL TROUBLE ANALYSIS

Operate the equipment on 110 volts.

Test No.	*Trouble*	*Probable Cause*
1	Voltage supply on, but lamp 115 on PN-13-A not glowing.	Defective lamp 115, open fuse 111-1 or 111-2, defective or open switch 116, defective auto-transformer or defective variac 117.

SERVICING AND REPAIR

Test No.	*Trouble*	*Probable Cause*
2	Lamp 115 on PN-13-A glowing, but meter 113 in PN-13-A not indicating.	Same as 1. Defective meter 113, defective or improperly adjusted variac 117 (look for defective sliding brush).
3	Meter 113 on PN-13-A indicates 230 volts, but no indicator lamps are glowing on PN-11-A.	Open fuses 2-1, 2-2, or defective MASTER FILAMENTS switch 13-1, R. F. FILAMENT switch 15-1 and A. F. FILAMENTS switch 15-2 in control panel or open 4-volt pilot lamp transformer windings.
4	Meter 113 on PN-13-A indicates 230 volts, and the green R. F. FILAMENTS and A. F. FILAMENTS indicator lamps are glowing on PN-11-A, but the red lamps R.F.H.V. and A.F.H.V. are off.	Same as 3. Defective lamps 10-3 and 10-4. Open or defective MASTER H. V. switch 13-2, open fuse 3-1 or 3-2, defective relay 6, open door-interlock switch, defective relay 8, defective or inoperative key on PN-11-A. Key not set at LOCAL.
5	Same as 4. Green R. F. FILAMENTS lamp operating, but not A. F. FILAMENTS lamp.	Same as 3. Defective power transformer 97 in upper PN-12-A. Open or defective A. F. FILAMENTS switch 15-2 in Control Panel PN-11-A.
6	A. F. FILAMENTS lamp on, but R. F. FILAMENTS lamp is off.	Same as 3. Defective transformer 97 in lower PN-12-A, open or defective R. F. FILAMENTS switch 15-1 in PN-11-A.
7	Red R.F.H.V. and A.F.H.V. indicator lamps glowing on PN-11-A but green R. F. FILAMENTS and A. F. FILAMENTS lamps not glowing.	Open fuses 4-1 and 4-2. Defective lamps. Defective transformer winding. Shorted terminals.
8	Transmitter operates properly, but no response obtained on TRANSMITTER AVAILABLE lamp on Control Unit RM-25 in operations block.	Defective lamp. Defective wiring between operations block and Radio Transmitter BC-640-A. Defective relay 7 in PN-11-A. Defective rectifier transformer, rectifier or capacitors 1-1, -2, -3, -4.
9	R. F. FILAMENTS and A. F. FILAMENTS lamps glowing on PN-11-A, but when LOCAL-REMOTE switch 55 in PN-10-A is operated to LOCAL, no clicking of relays is heard.	Defective transformer 16 in PN-11-A, shorted capacitor 1-1 or 1-2 in the control panel, open choke 9 or defective switch 55 in PN-10-A. Defective microphone plugged into jack 40 or 41 or defective jack 40 or 41 on the modulator panel. Defective rectifier. Defective relay No. 8, H. V. contactor No. 6 or interlock.
10	Transmitter output is very weak, all meter readings are half-scale or less and the R.F.H.V. indicator lamp on PN-11-A glows dimly.	Defective TUNE-OPERATE switch 14 on PN-11-A or switch not set at OPERATE.
11	R.F.H.V. lamp glowing on PN-11-A, but A.F.H.V. lamp is not.	Defective lamp 10-4. Defective transformer 98 in upper PN-12-A or open or defective A. F. FILAMENTS switch 15-4 in PN-11-A.
12	A.F.H.V. lamp glowing on Control Panel PN-11-A, but R.F.H.V. lamp is not.	Defective lamp 10-3. Defective transformer 98 in lower PN-12-A, defective TUNE-OPERATE switch 14 in PN-11-A or defective R.F.H.V. switch 15-3 in the control panel.

SERVICING AND REPAIR

Test No.	*Trouble*	*Probable Cause*
13	Everything satisfactory, but MODULATOR ANODE CURRENT meter 44 does not indicate properly.	Defective meter 44 or shorted capacitor 39 in PN-10-A.
14	All four indicator lamps glowing on PN-11-A, transmitter carrier output is satisfactory, but there is no modulation and the MODULATOR ANODE CURRENT meter on PN-10-A does not indicate.	Defective upper PN-12-A, meter 44, transformer 60 in PN-10-A or open grid circuit in Tubes VT-217 in the modulator panel.
15	R-F output satisfactory, but no modulation present on carrier and MODULATOR ANODE CURRENT meter on PN-10-A reads approximately 8 ma.	No high voltage plate supply. Defective tubes.
16	Transmitter operates properly but there is no tone modulation when terminals 11 and 12 are shorted on PN-10-A. Modulator relay 42 closes (hear it click).	Oscillator output control 52 misadjusted, defective transformer 61, defective Tube VT-94 in socket 62-5. Defective capacitors 34 and 35 or resistors 48 and 49. Dirty relay (42) contacts.
17	Same as 16, but relay 42 does not close when terminals 11 and 12 are shorted.	Same as 16. Defective keying relay 42, rectifier 54, shorted capacitor 36-1 or 36-2.
18	Same as 15. MODULATOR ANODE CURRENT meter on PN-10-A indicates only slightly and the per cent of modulation is very low.	Defective tubes. Low plate voltage. Volume control (53) misadjusted. Check entire PN-10-A.
19	Same as No. 14 except MODULATOR ANODE CURRENT meter indicates properly.	Shorted secondary of transformer (59) when modulating.
20	Transmitter operates properly on tone modulation but not on speech modulation.	Defective REMOTE-LOCAL switch 55 in PN-10-A, open resistor 45-1 or 45-2, defective transformer 56, defective microphone or defective jacks 40, 41.
21	Both meters in PN-9-A not indicating with meter switch 176 in any one of its five positions. All four indicator lamps on PN-11-A are glowing.	Defective filament transformer 196 on PN-9-A or defective lower PN-12-A. Defective meter. Defective rotor contact of switch 176.
22	All circuits satisfactorily tuned on Oscillator Panel PN-9-A except IPA plate circuit which gives zero indication.	Open resistor 195, defective Tube VT-204 in socket 199-3, open choke 177 or 159, neutralizing link not in place, defective 800-volt circuit in lower PN-12-A. Defective meter switch 176.
23	No dip obtained in CATHODE CURRENT meter (PN-9-A) with meter switch 176 in CO position. Meter indicates correct off-tune current (about 30 ma).	No crystal in socket, or defective crystal. Defective Tube VT-175. Shorted tank circuit. Defective VT-100.
24	No reading obtained on CATHODE CURRENT of PN-9-A meter with meter switch 176 set at CO or T1.	Defective 315-volt circuit in lower PN-12-A or defective wiring between terminal 13 on PN-9-A and terminal 15 on PN-12-A.

SERVICING AND REPAIR

Test No.	*Trouble*	*Probable Cause*
25	CATHODE CURRENT meter of PN-9-A reads below 35 ma with meter switch 176 in T2 position. Plate circuit cannot be tuned.	Defective Tube VT-100 or VT-204 in socket 199-1. Defective capacitor 168-1.
26	CATHODE CURRENT meter of PN-9-A indicates properly with meter switch 176 in any position except T2.	Open resistor 192-2.
27	CATHODE CURRENT meter of PN-9-A indicates properly with meter switch 176 in CO or IPA position but not with switch at T1, T2 or D.	Defective 395-volt circuit in lower PN-12-A. Defective wiring between terminal 14 on PN-9-A and terminal 16 on lower PN-12-A.
28	IPA GRID CURRENT meter of PN-9-A indicates 7 ma or less.	One or more defective tubes in PN-9-A, or IPA improperly neutralized.
29	CATHODE CURRENT meter of PN-8-A does not indicate with meter switch 150 in position C1 or C2.	Neutralizing link not in place, open choke 134-1, defective transformer 146, open secondary of transformer 59 of PN-10-A. Plate by-pass capacitor 125 shorted. No plate supply voltage.
30	CATHODE CURRENT meter in PN-8-A indicates for only one position of meter switch 150.	Defective resistor 143-1 or 143-2, defective meter switch 150. Defective Tube VT-204. No filament power. Plate shorting bar improperly tightened.
31	CATHODE CURRENT meter readings on the Amplifier Panel vary by more than 10 ma when meter switch 150 is transferred from one of its positions to the other.	Defective Tube VT-204. Test by replacement. Defective grid resistor 144 or 145.
32	GRID CURRENT meter in PN-8-A indicates below 3 ma with meter switch 149 either in G1 or G2 position.	Defective or improperly tuned PN-9-A. PN-8-A improperly neutralized.
33	GRID CURRENT meter in PN-8-A varies by more than 3 ma when meter switch 149 is transferred from G1 to G2 position.	Defective Tube VT-204. Open resistor 143-3, 143-4, 144-1 to 144-4 inclusive or 145-1.
34	Operation of PN-8-A erratic or panel can not be neutralized.	Loose mechanical coupling between neutralizing capacitor 131A and 131B. Open resistor 141-2. Defective tube.
35	Plate circuit of PN-8-A (tuned by ANODE dial) will not cover frequency range.	Plate-line shorting bar in wrong position. Check alignment of anode tuning capacitor 129.
36	Unstable tuning and operation of the amplifier panel.	Defective filament by-pass capacitor 121-1 to 121-4 inclusive. Defective resistor 141-2.
37	Proper reading not obtained on the amplifier panel CATHODE CURRENT meter when COUPLING dial is adjusted. The load does not increase sufficiently when coupling is increased.	AERIAL dial on the amplifier panel not properly tuned. Defective antenna, transmission line, or transmission line socket. Shorted or open antenna-tuning circuits.
38	Low or zero indication on PN-8-A GRID CURRENT meter (less than .8 ma) with meter switch 149 on MON.	No r-f output from transmitter, short-circuited antenna transmission line, defective Tube VT-94 in amplifier panel, defective capacitor 123-1, 123-2 or switch 149; open resistor 141-1, open choke 134-2, 134-3 or 134-4.

Test No.	*Trouble*	*Probable Cause*
39	No output obtained from MONITOR TEL. jack on the amplifier panel.	Defective jack 133, open resistor 142 or 141-1, open choke 134-2, -3 or -4; defective Tube VT-94 or capacitor 123-1, 123-2, or shorted capacitor 124.
40	Tuning of PN-8-A ANODE dial is unstable and accompanied by considerable backlash.	No lubricant on guide rods of capacitor 129 or on cam-and-ball joints. Relubricate very sparingly. Recenter guide pins if necessary.
41	PN-8-A ANODE dial will not tune properly at some points on dial and CATHODE CURRENT meter reads excessively high.	Dirt between cylinders of capacitor 129, or cylinders not properly aligned, resulting in short circuit.
42	Tube VT-204 in the amplifier panel has unusually short life.	PN-8-A tuned with TUNE-OPERATE switch on Control Panel PN-11-A set at OPERATE, thus allowing plate circuit (ANODE dial on the amplifier panel) to remain untuned with normal grid drive on tube (AMP. GRID dial on PN-8-A tuned).

13. TROUBLE ANALYSIS BY MEANS OF VOLTAGE TESTS

Test conditions must be as follows:

Tune up the transmitter on any frequency (see Temporary Instructions for Radio Transmitter BC-640-A). Open the rear door of Cabinet CS-88-A, but keep the door interlock switch closed by means of a jumper connected between terminals 25 and 26 on Control Panel PN-11-A. All panels of the transmitter must be properly interconnected. Transmitter must be wired to 110/125-volt primary power source. Unless otherwise specified, voltages should not vary by more than ±10%.

Test No.	*Voltage Across Terminals*	*Additional Test Conditions*	*Volts*	*Probable Cause of Incorrect Reading*
1	1 and 2 of Power Control Panel PN-13-A.		110/125 a-c	Defective wiring.
2	Top of fuses 111-1, 111-2.		110/125 a-c	Open fuse 111-1 or 111-2.
3	2 and 3 of auto-transformer.		110/125 a-c	Same as 1 and 2. Defective switch 116.
4	1 and 3 of auto-transformer.		220/250 a-c	Same as 3. Defective auto-transformer.
5	5 and 6 of Power Control Panel PN-13-A.		230 a-c	Same as 4. Defective variac 117.
6	1 and 2 of PN-11-A.		230 a-c	Same as 5. Defective wiring between PN-11-A and PN-13-A.
7	11 and 12 of PN-11-A.		230 a-c	Defective fuses 2-1, 2-2, 4-1, 4-2. Open MASTER FILAMENTS switch 13-1, open R.F. FILAMENTS switch, defective control panel.
8	13 and 14 of PN-11-A.		230 a-c	Same as 6. Defective fuses 2-1, 2-2, 4-1, 4-2. Open MASTER FILAMENTS switch 13-1, open A.F. FILAMENTS switch, defective control panel.

SERVICING AND REPAIR

Test No.	Voltage Across Terminals	Additional Test Conditions	Volts	Probable Cause of Incorrect Reading
9	16 and 17 of PN-11-A.	TUNE-OPERATE switch set at OPERATE	230 a-c	Defective R.F.H.V. switch, TUNE-OPERATE switch 14, fuse 2-1 or 2-2, MASTER FILAMENTS switch 13-1, MASTER H.V. switch 13-2, fuse 3-1 or 3-2, or contactor 6. (Check contactor by closing it with an insulated rod. If this corrects faulty reading, then contactor or associated circuit is defective.)
10	15 and 17 of PN-11-A.	TUNE-OPERATE switch set at TUNE.	230 a-c	Same as 9.
11	19 and 20 of PN-11-A.		230 a-c	Same as 9 except A.F.H.V. switch is substituted for R.F.H.V. switch.
12	34 and 35 of cabinet terminal board.		24 d-c	Same as 6. Open fuse 2-1 or 2-2, open MASTER FILAMENTS switch 13-1, defective transformer 16 in control panel, defective rectifier 12 or relay 7. Check wiring between terminals 21 and 22 of control panel. Grounded microphone circuit on PN-10-A.
13	23 and 24 of PN-11-A.		24 d-c	Same as 6. Open fuse 2-1 or 2-2, open MASTER FILAMENTS switch, defective transformer 16, rectifier 12, or shorted capacitor 1-1, 1-2. Defective choke 9, relay 8, open winding in coil of relay 7. Check for external short by removing wires from terminals 23 and 24.
14	2 and 3 of lower PN-12-A.	TUNE-OPERATE switch set at OPERATE	230 a-c	Same as 11. Defective wiring between terminals 16 and 17 on PN-11-A and 2 and 3 on lower power supply panel.
15	4 and 5 of lower PN-12-A.		230 a-c	Same as 7. Defective wiring between terminals 4 and 5 of lower PN-12-A and terminals 11 and 12 of PN-11-A.
16	7 and 8 of PN-11-A.		4 a-c	Same as 14. Defective plate transformer 98 in lower PN-12-A. Defective wiring between terminals 10 and 11 of lower power supply panel and terminals 7 and 8 of PN-11-A.
17	3 and 4 of PN-11-A.		4 a-c	Same as 15. Defective filament transformer 97 in lower power supply panel, defective wiring between terminals 10 and 11 in lower power supply panel and 3 and 4 of control panel.
18	14 and 17 of lower PN-12-A.		800 d-c	Same as 14 and 15. Defective Tubes VT-145, open choke 94-1, shorted capacitor 91 or 92 or shorted external circuit. Remove and check external wiring.

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers Bendix*	*Drawing Numbers Sig. Corp.*
43	3C336-8	Reactor	30h at .025a d-c, 870Ω d-c resistance, 1500v rms at 60 cycle test, Spec. XR2C	L-V filter	Bendix	A27098	
44	3F920-7.1	Meter	0-200 ma d-c, flush mounting wide flange metal case, Model 506, calibrated for use on 1/8″ steel panels	Modulator cathode	Weston	A104194-3	
45-1	3Z6020-13	Resistor	200Ω ±10%, 1/2w, Type BT-1/2	Input	IRC	A104572-201	
45-2	.	Resistor	Same as 45-1	.	.	.	
46-1	3Z6610-38	Resistor	10,000Ω ±10%, 1/2w, Type BT-1/2	First audio grid filter parasitic suppressor	IRC	A104572-103	
46-2	.	Resistor	Same as 46-1	.	.	.	
47-1	3Z6650-45	Resistor	50,000Ω ±10%, 1/2w, Type BT-1/2	Second audio loading	IRC	A104572-503	
47-2	.	Resistor	Same as 47-1	.	.	.	
48	3Z6801-19	Resistor	1 megohm ±10%, 1/2w, Type BT-1/2	Audio oscillator grid leak	IRC	A104572-105	
49	3Z6650-14	Resistor	50,000Ω ±5%, 2w, Type BT-2 or BW-2	Audio oscillator series plate dropping	IRC	A105162-503	
50	3Z6050-21	Resistor	500Ω ±10%, 2w, Type BT-2	First audio cathode	IRC	A105162-501	
51	3Z5125	Resistor	325Ω ±5%, 18w, Grade 1, Class 1, Style E	Second audio cathode	HH	A104573-2	
52	3Z6020-21	Resistor	Dual unit each 600Ω, ±10%, Taper B, clockwise res. increase from front of unit, Type CS	Audio oscillator volume control	IRC	A104577-2	
53	3Z6615-35	Resistor	Dual unit each 15,000Ω ±10%, Taper B, clockwise res. increase from front of unit, Type CS	Volume control	IRC	A104577-1	
54	3H4856-1	Rectifier	Half wave selenium rectifier to deliver 5v d-c at .05 amp., Cat. No. 3DC428	Rectifier	Int. Tel.	A104500	

APPENDIX

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
55	3Z8650	Switch	One way lever key, locking, six sets break-make contacts, complete with escutcheon, Type 170 amp.	Remote-local	Stromberg Carlson	A104575	
56	2Z9881	Transformer	Pri: 600Ω total impedance center tap leads from each half brought out to individual terminals. Each half tapped for total impedance of 100 ohms. Sec: Total imp. 30,000Ω to feed push-pull grids. Electrostatic shield between pri. & sec. Response 3 db variation 200 to 4000 cycles. Spec. XMI-18	Microphone input	Bendix, Denyon	A103006	
57		Transformer	Pri. impedance 40,000Ω; sec. impedance 100,000Ω; D-C Resistance Pri. — 770Ω; sec. — 1500Ω; Response ±1 db 200—4000Ω	Interstage transformer	Bendix, Denyon	A103008	
58		Transformer	Imp. Pri., 32,000Ω; Sec. 10,000Ω, turns ratio P to S, 1.78 to 1, Res. Pri., 475Ω; Sec. 105Ω, Response ±1 db, 30-10,000 cycles, Spec. X1-36.	Driver transformer	Bendix, Denyon	A103010	
59		Transformer	Imp. Pri. 15,000Ω; Sec. 5700Ω, turns ratio 1.63 to 1, Res. Pri. 290Ω, Sec. 105Ω, Response ±6 db, 100 to 5000 cycles, Spec. XMO-22.	Modulation transformer	Bendix, Denyon	A103000	
60		Transformer	Pri. 230v 50-60 cycles, Sec. 6.3v at 1.4 amp., center tap 6.3v at 8 amp; 6.3v at 1.3 amp., Spec. XF-38	Filament	Bendix	A27086	
61		Transformer	Pri. 250v, freq. 1020 cycles, Pri. Ind. 5.7h, Spec. XO-24A	Audio oscillator	Bendix	A27096	
62-1		Socket	8 Contact, Cat. No. SS8	Tube receptacle	Amphenol	A18168-6	
62-2		Socket	Same as 62-1	Tube receptacle	Amphenol	A18168-6	
62-3		Socket	Same as 62-1	Tube receptacle	Amphenol	A18168-6	
62-4		Socket	Same as 62-1	Tube receptacle	Amphenol	A18168-6	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
62-5		Socket	Same as 62-1	Tube receptacle	Amphenol	A18168-6	
63-1		Socket	4-contact, Cat. No. SS4	Tube receptacle VT-217	Amphenol	A18168-1	
63-2		Socket	Same as 63-1	Tube receptacle VT-217	Amphenol	A18168-1	
VT-94		Vacuum Tube	Detector Amplifier Triode Type 6J5	Input voltage amplifier	RCA		
VT-94		Vacuum Tube	Detector Amplifier Triode Type 6J5	Input voltage amplifier	RCA		
VT-175		Vacuum Tube	RF Power Amplifier Pentode Type 1613	Push-pull driver stage	RCA		
VT-175		Vacuum Tube	RF Power Amplifier Pentode Type 1613	Push-pull driver stage	RCA		
VT-217		Vacuum Tube	Transmitting Triode Type 811	Class B modulator	RCA		
VT-217		Vacuum Tube	Transmitting Triode Type 811	Class B modulator	RCA		
VT-94		Vacuum Tube	Detector Amplifier Triode Type 6J5	Audio oscillator	RCA		

c. *Power Supply Panel PN-12-A*

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
91	3DB10-19	Capacitor	10 mfd, 1500v d-c, Cat. No. TJL15100	High voltage filter	Cornell-Dubilier	C58338-6	
92	3DB10-20	Capacitor	10 mfd, 600v d-c, Cat. No. TJL6100	Low voltage filter	Cornell-Dubilier	C58338-5	
93-1	3DA100-108	Capacitor	0.1 mfd, 600v d-c, Cat. No. DY-6010, Spec. 71-516E, Dykanol	Line bypass	Cornell-Dubilier	A104625-1	
93-2	.	Capacitor	Same as 93-1	Line bypass	.	.	
94-1	3C336-4	Reactor	11h, .270 amp., 90Ω d-c resistance, Spec. XR-24-B	Choke coil	Bendix	A27094	
94-2	.	Reactor	Same as 94-1	Choke coil	.	.	
95-1	3Z6580-6	Resistor	8000Ω, 90w, Style B (part of voltage divider circuit)	Bleeder	HH	A104573-5	
95-2	.	Resistor	Same as 95-1	Bleeder	.	.	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
96	3Z6580-7	Resistor	1500Ω, 40w, Style D (part of voltage divider circuit)	Bleeder	H.H.	A104573-3	
97	2Z9600	Transformer	Pri: 230v, 50-60 cycle, 61va, Sec: two 5v windings at 3 amp., C.T., one 5v winding at 6 amp., C.T., one 4v winding at 0.25 amp.	Filament	Bendix	A27090	
98	2Z9601	Transformer	Pri: 230v, Sec: 513v & 1025v ±2% at 427 ma, d-c, and 4v ±4% at 25 ma, Spec. XP-21	Plate	Bendix	A103004	
99-1	2Z8762.3	Socket	4 prong, Alsimag 196 base, Type 224	Vacuum tube	Johnson Co.	A30440	
99-2	.	Socket	Same as 99-1	Vacuum tube	.	.	
99-3	.	Socket	Same as 99-1	Vacuum tube	.	.	
99-4	.	Socket	Same as 99-1	Vacuum tube	.	.	
	2T145	Tube	Full wave rectifier, Type 5Z3	High vacuum rectifier	RCA	.	

d. *Power Control Panel PN-13-A*

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
111-1		Fuse	250v, 10 amp.	A-C input	Bussman	A104542-4	
111-2		Fuse	Same as 111-1	A-C input	.	.	
112-1		Fuse	250v, 5 amp.	A-C input	Bussman	A104542-1	
112-2		Fuse	Same as 112-1	A-C input	.	.	
113		Meter	Range 0–300 volts a-c, Model 517	Output voltage	Western Electric	A104615	
114		Lamp	150v, 6w, Code SG, clear, Type 56	Pilot light	H.R. Kirkland	A104685	
115		Bull's eye unit	Cat. No. CHR 601	Bull's eye unit	.	A104684	
116		Switch	Three pole, standard contact, 15 amp., 250v a-c, Cat. No. 8337	Power	Cutler-Hammer	A104675	
117		Transformer	Variac, voltage input 220 to 250v, 50/60 cycle, similar to Type 100R	Voltage regulator	General Radio	C58370	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
e. Amplifier Panel PN-8-A							
121-1	3DA5-12	Capacitor	.005 mfd ±10%, 600v dct, mica, 300v working, Aerovox Type 1467, Cornell Dubilier Type 1WL	Filament bypass	Aero., C.D.	A104614-2	
121-2	.	Capacitor	Same as 121-1	.	.	.	
121-3	.	Capacitor	Same as 121-1	.	.	.	
121-4	.	Capacitor	Same as 121-1	.	.	.	
122-1	3D9100-24	Capacitor	.0001 mfd ±10%, 1000v dct, mica, Type 1468	Monitor filament bypass	Aero.	A10459-1	
122-2	.	Capacitor	Same as 122-1	.	.	.	
122-3	.	Capacitor	Same as 122-1	Monitor cathode bypass	.	.	
122-4	.	Capacitor	Same as 122-1	Monitor filter	.	.	
122-5	.	Capacitor	Same as 122-1	Monitor filter	.	.	
122-6	.	Capacitor	Same as 122-1	Monitor filter	.	.	
123-1	3D9001E5	Capacitor	1.5 mmf ±1/2 mmf, 1000v dct, mica, Type 1468	R-F monitor coupling	Aero.	A104591-3	
123-2	.	Capacitor	Same as 123-1	.	.	.	
124	3DA100-55	Capacitor	0.1 mfd, 600v dcw, Dykanol, Type DY-6010	Audio monitor coupling	C.D.	A104625-1	
125	3D9500-68	Capacitor	.0005 mfd ±10%, 5000v dct, mica, Type 1652	Plate bypass	Aero.	A104195-6	
126-1	3D9500-67	Capacitor	.0005 mfd ±10%, 1000v dct, mica, Type 1468	Grid bypass	Aero.	A104591-2	
126-2	.	Capacitor	Same as 126-1	.	.	.	
127	3DA5-48	Capacitor	.005 mfd ±10%, 1000v dct, mica, Type 1650	Grid shunt	Aero.	A104195-5	
128	3D9032V	Capacitor	Dual variable air, 32 mmf per section, .030″ air gap, special	Grid tuning	Cardwell	A105268	
129		Capacitor	Special line tuning	Plate tuning		AA105248-1 A104175	
130	3D9017VE5	Capacitor	Dual variable air, 17.5 mmf per section, .07″ air gap, similar to ET, 15AD	Antenna tuning	Cardwell	A105331	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Sig. Corp.
131		Capacitor	Split stator-split rotor dual variable, .111″ air gap, two plates per section, special, insulated rotors and insulating end plates	Neutralizing	Cardwell	A105269	
132-1	3DA-27	Capacitor	.02 mfd +14% —6%, 1000v dct, mica	Meter bypass	C.D.	A104604	
132-2	.	Capacitor	Same as 132-1	.	.	.	
133	2Z5597.1	Jack	For tip, ring, sleeve plug, Type 239-A	Monitor jack	Stromberg Carlson	A104574-2	
134-1	3F2999-5	Inductor	20 turns No. 28 DCC on 1/4″ dia. bakelite form threaded at 20 per inch	Plate choke	Stromberg Carlson	AA105375-1	
134-2	.	Inductor	Same as 134-1	Monitor filter	.	.	
134-3	.	Inductor	Same as 134-1	Monitor filter	.	.	
134-4	.	Inductor	Same as 134-1	Monitor filter	.	.	
135	3F2999-2	Inductor	Two 7″ sections of 1/4-inch OD silver plated copper tubing bent to form an L	Grid tank	Stromberg Carlson	A104635	
136	3F2999	Inductor	Two 15″ sections of 1/4-inch OD silver plated copper tubing bent to form an L	Plate tank	Stromberg Carlson	A105235	
137	3F2999-3	Inductor	2-7″ pieces of 1/8-inch OD silver plated copper tubing with clamps	Antenna coupling	Stromberg Carlson	AA105288-1	
138	3F2999-4	Inductor	Two 6″ pieces of 1/8-inch OD silver plated copper tubing with two 90° bends	Antenna tuning	Stromberg Carlson	AA105996-1	
139	3F902-7	Meter	0—25 ma d-c, calibrated for use on 1/8″ steel panel, Type 506	Amplifier grid meter	Weston	A104194-1	
140	3F910-3	Meter	0—100 ma d-c, calibrated for use on 1/8″ steel panel, Type 506	Amplifier cathode meter	Weston	A104194-2	
141-1	3Z6050-10	Resistor	500Ω ±5%, 2w, Type BT-2 or BW-2	Monitor load parasitic suppressor	IRC	A105162-501	
141-2	.	Resistor	Same as 141-1	Choke shunt parasitic suppressor	.	.	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Sig. Corp.
142	3Z6050-21	Resistor	5000Ω, 2w, Type BT-2 or BW-2	Monitor jack series	IRC	A104162-502	
143-1	3Z6005-30	Resistor	50Ω ±5%, 2w, Type BT-2 or BW-2	Cathode meter shunt	IRC	A105162-50	
143-2	.	Resistor	Same as 143-1	.	.	.	
143-3	.	Resistor	Same as 143-1	Grid meter shunt	.	.	
143-4	.	Resistor	Same as 143-1	Grid meter shunt	.	.	
143-5	.	Resistor	Same as 143-1	Monitor meter shunt	.	.	
144-1	3Z6614-1	Resistor	14,000Ω ±5%, 2w, Type BT-2 or BW-2	Grid leak	IRC	A105162-143	
144-2	.	Resistor	Same as 144-1	.	.	.	
144-3	.	Resistor	Same as 144-1	.	.	.	
144-4	.	Resistor	Same as 144-1	.	.	.	
145-1	3Z6300-10	Resistor	3000Ω ±5%, 2w, Type BT-2 or BW-2	Grid leak	IRC	A105162-302	
145-2	.	Resistor	Same as 145-1	.	.	.	
146	2Z9878-13	Transformer	Pri. 1 & 2: 230v, 50/60-cycle, 40 va, Sec. 3 & 4: 6.3v ±2%, .32 amp. 5 & 7, 6.3v +3%, —1% @ 3 amp. center tapped. 8 & 10: Same as 5 & 7	Filament	Bendix	A27088	
147-1	2Z8659-4	Socket	4-contact, Type SS4	Amplifier socket	Amphenol	A18168-1	
147-2	.	Socket	Same as 147-1	.	.	.	
148	2Z8795.1	Socket	Octal steatite, Type SS8	Monitor socket	Amphenol	A18168-6	
149	3Z9825-17	Switch	Single-pole, 3-position wafer, spaced 90°	Grid meter switch	Oak	A105371	
150	3Z9825-16	Switch	Single-pole, 2-position wafer, spaced 180°	Cathode meter switch	Oak	A105370	
VT-204	2T204	Vacuum Tube	U.S. Army VT-204, transmitting type triode, Type HK-24-G	Amplifier	H & K		
VT-204	.	Vacuum Tube	U.S. Army VT-204, transmitting type triode, Type HK-24-G	Amplifier	H & K		
VT-94	2T94	Vacuum Tube	U.S. Army VT-94, detector amplifier triode, Type 6J5	Monitor rectifier	RCA		

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
f. Oscillator Panel PN-9-A							
158		Resistor	500Ω ±5%, 2w, Type BW-2	Parasitic suppressor	IRC	A105162-501	
159		Inductor	81 turns, No. 32 DCC wire, close wound on a 1/2" dia. form, winding length 1½"	I.P.A. plate choke	Bendix	AA105376-2	
160		Socket	2-prong, special	Crystal socket	.	AC58396-1	
161-1	3DA5-25	Capacitor	.005 mfd ±10%, 600v dct, mica, Aerovox Type 1467, Cornell Dubilier Type 1WL	Oscillator cathode bypass	Aero., C.D.	A104614-2	
161-2	.	Capacitor	Same as 161-1	Oscillator filament bypass	.	.	
161-3	.	Capacitor	Same as 161-1	Oscillator filament bypass	.	.	
161-4	.	Capacitor	Same as 161-1	Oscillator screen bypass	.	.	
161-5	.	Capacitor	Same as 161-1	First tripler cathode bypass	.	.	
161-6	.	Capacitor	Same as 161-1	First tripler filament bypass	.	.	
161-7	.	Capacitor	Same as 161-1	First tripler filament bypass	.	.	
161-8	.	Capacitor	Same as 161-1	First tripler screen bypass	.	.	
161-9	.	Capacitor	Same as 161-1	Doubler filament bypass	.	.	
161-10	.	Capacitor	Same as 161-1	Doubler filament bypass	.	.	
162-1	3DA5-48	Capacitor	.005 mfd ±10%, 1000v dct, mica, Type 1650	Oscillator plate bypass	Aero.	A104195-5	
162-2	.	Capacitor	Same as 162-1	Doubler grid leak bypass	.	.	
162-3	.	Capacitor	Same as 162-1	Doubler plate bypass	.	.	
163-1	3D9009V	Capacitor	9—106 mmf, variable air capacitor, .045-inch air gap, Alsimag 196 insulation	Oscillator plate tuning	Johnson Co.	A105240-1	
163-2	.	Capacitor	Same as 163-1	First tripler plate tuning	.	.	

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers*	
						Bendix	*Sig. Corp.*
164	3DA2-78	Capacitor	.002 mfd ±2%, 1000v dct, mica, high stability, low temperature coefficient, Type 1650	Oscillator series	Aero.	A104195-8	
165	3D9050-58	Capacitor	50 mmf ±10%, 1000v dct, Type 1650	First tripler grid blocking	Aero.	A104195-4	
166-1	3DA2-79	Capacitor	.002 mfd ±10%, 2500v dct, Type 1650	First tripler plate bypass	Aero.	A104195-7	
166-2	.	Capacitor	Same as 166-1	Second tripler plate bypass	.	.	
166-3	.	Capacitor	Same as 166-1	Doubler grid blocking	.	.	
167	3D9002VE8	Capacitor	2.8–8.5 mmf, variable, .06-inch air gap	First tripler trimmer	Cardwell	A105262	
168-1	3D9500-68	Capacitor	.005 mfd ±10%, 5000v dct, mica, Type 1652	Second tripler grid blocking	Aero.	A104195-6	
168-2	.	Capacitor	Same as 168-1	IPA grid blocking	.	.	
168-3	.	Capacitor	Same as 168-1	IPA plate bypass	.	.	
169-1	3DA2-77	Capacitor	.002 mfd +14% —6%, 500v dct, mica, Aero type 1467, C.D. Type 1WL	Second tripler grid bypass	Aero., C.D.	A104614-1	
169-2	.	Capacitor	Same as 169-1	Second tripler filament bypass	.	.	
169-3	.	Capacitor	Same as 169-1	Second tripler filament bypass	.	.	
169-4	.	Capacitor	Same as 169-1	IPA filament bypass	.	.	
169-5	.	Capacitor	Same as 169-1	IPA filament bypass	.	.	
169-6	.	Capacitor	Same as 169-1	IPA grid leak bypass	.	.	
170	3D9007V	Capacitor	7—48 mmf, (4 stator plates) variable air capacitor, .045-inch air gap, Alsimag 196 insulation, Type 50F20	Second tripler tuning	Johnson Co.	A105239	
171	3D9002VE5	Capacitor	2.5—35 mmf per section, dual variable, .03″ air gap, 5 stator plates—6 rotor plates per section	Doubler plate tuning	Cardwell	A105623	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers	
						Bendix	*Sig. Corps*
172	3D9005V-1	Capacitor	5—27 mmf per section, dual, variable air capacitor	IPA plate tuning	Cardwell	A105241	
173	3D9001VE9	Capacitor	1.9—3.0 mmf, variable air capacitor, .081-inch air gap, ceramic insulation	IPA neutralizing	Cardwell	A105624	
174-1	3DA20-38	Capacitor	.02 mfd +14%, —6%, 1000v dct, mica	Cathode meter bypass	C.D.	A104604	
174-2	.	Capacitor	Same as 174-1	IPA grid meter bypass	.	.	
175	3D9015-7	Capacitor	15 mmf ±1 mmf, ceramic, wax impregnated, Type NPOL	Crystal bypass	Erie	A18182-17	
176	3Z9825-18	Switch	Single-pole wafer switch, 5-positions, spaced 30° apart	Cathode meter selector switch	Oak	A105946	
177		Inductor	20 turns No. 28 DCC 1/4″ D, 20 turns per inch	IPA plate choke	Bendix	AA105375-1	
178	3C2505-2	Inductor	8.67 microhenries, 31 turns No. 20 DCC close wound on 3/4-inch dia. form, tapped at 15 1/2 turns	Oscillator tank	Bendix	AA105373-1	
179	3C2505-3	Inductor	.885 microhenries, 7 turns No. 16 silver plated copper wire at 6-inch on 1-inch dia. form	First tripler tank	Bendix	AA105374-1	
180	3C336-5	Inductor	25.7 microhenries, 81 turns No. 32 DCC on 1/2-inch dia. form	Second tripler grid choke	Bendix	AA105376-1	
181	3C2505	Inductor	3 turns 1/8-inch OD silver plated copper tubing, 3/4-inch ID, 3″ long	Second tripler tank	Bendix	AA105372-1	
182	3C336-6	Inductor	30 turns No. 26 DCC wound on 1/2-inch dia. form, threaded at 20 per inch	Second tripler plate choke	Bendix	AA105377-1	
183	3C336-7	Inductor	.782 microhenries, 30 turns No. 26 DCC on 1/4-inch dia. form, threaded at 20 per inch	Doubler choke	Bendix	AA105378-1	
184	3C2505-1	Inductor	4 turns 1/8-inch OD copper tubing silver plated 1/2-inch ID and 1″ long	Doubler tank	Bendix	A103752	

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers*	
						Bendix	*Sig. Corps.*
185	3F2999-1	Inductor	Transmission line type, 15-inch length of 1/4-inch OD silver plated copper tubing bent to form a U, center to center spacing 1 1/8-inch, this is again bent to form another shallow U	IPA tank	Bendix	A105261	
186	3F902-7	Meter	0—25 ma, meter Type 506	IPA grid meter	Weston	A104194-1	
187	3F910-3	Meter	0—100 ma, meter, Type 506	Cathode current meter	Weston	A104194-2	
188	3Z6700-12	Resistor	100,000Ω ±5%, 2w, Type BW-2 or BT-2	Oscillator grid leak	IRC	A105162-104	
189-1	3Z6005-30	Resistor	50Ω ±5%, 2w, Type BW-2 or BT-2	Oscillator meter shunt	IRC	A105162-50	
189-2	.	Resistor	Same as 189-1	First tripler meter shunt	.	.	
189-3	.	Resistor	Same as 189-1	Second tripler meter shunt	.	.	
189-4	.	Resistor	Same as 189-1	Doubler meter shunt	.	.	
189-5	.	Resistor	Same as 189-1	IPA meter shunt	.	.	
190-1	3Z6650-49	Resistor	50,000Ω ±5%, 2w, Type BW-2 or BT-2	Oscillator screen dropping	IRC	A105162-503	
190-2	.	Resistor	Same as 190-1	First tripler screen dropping	.	.	
191-1	3Z6625-28	Resistor	25,000Ω ±5%, 2w, Type BW-2 or BT-2	First tripler grid leak	IRC	A105162-253	
191-2	.	Resistor	Same as 191-1	Second tripler grid leak	.	.	
192-1	3Z6100-65	Resistor	1000Ω ±5%, 15w, Style F	First tripler cathode	H.H.	A104573-6	
192-2	.	Resistor	Same as 192-2	Second tripler cathode	.	.	
193-1	3Z6675-14	Resistor	7500Ω ±5%, 2w, Type BW-2 or BT-2	Doubler grid leak	IRC	A105162-752	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corps
193-2	.	Resistor	Same as 193-1	.	.	.	
194-1	3Z6500-67	Resistor	5000Ω ±5%, 2w, Type BW-2 or BT-2	Amplifier grid leak	IRC	A105162-502	
194-2	.	Resistor	Same as 194-1	.	.	.	
195	3Z6012A5-1	Resistor	125Ω ±5%, 15w, Style F	IPA cathode	H.H.	A104573-1	
196	3H5640	Transformer	Filament transformer, Pri.: 230v, 50/60-cycle, 67 va; Sec.: No. 1, 6.3v +3% —1%, 10.1 va No. 2, 6.3v +3% —1%, C.T., 19 va No. 3, 6.3v +3% —1%, C.T., 19 va No. 4, 6.3v +3% —1%, C.T., 19 va	Filament	Acme, Bendix	A27092	
197	2Z8659	Socket	8-contact octal sockets, beryllium contact springs glazed steatite, Type SS-8	Oscillator	Amphenol	A18168-6	
198	2Z8659-2	Socket	5-contact socket, beryllium contact springs glazed steatite, Type SS-5	First tripler	Amphenol	A18168-2	
199-1	2Z8659-4	Socket	4-contact socket, beryllium copper springs, glazed steatite, Type SS-4	Second tripler	Amphenol	A18168-1	
199-2	.	Socket	Same as 199-1	Doubler	.	.	
199-3	.	Socket	Same as 199-1	Amplifier	.	.	
VT-175	2T175	Vacuum Tube	U.S. Army VT-175, Type 1613	Oscillator			
VT-100	2T100	Vacuum Tube	U.S. Army VT-100, Type 807	First tripler			
VT-204	2T204	Vacuum Tube	U.S. Army VT-204, Type HK-24-G	Second tripler			
VT-204	.	Vacuum Tube	U.S. Army VT-204, Type HK-24-G	Doubler			
VT-204	.	Vacuum Tube	U.S. Army VT-204, Type HK-24-G	Amplifier			

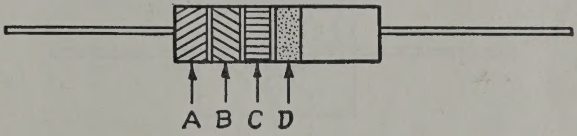
APPENDIX

16. RMA COLOR CODE FOR RESISTORS AND CAPACITORS

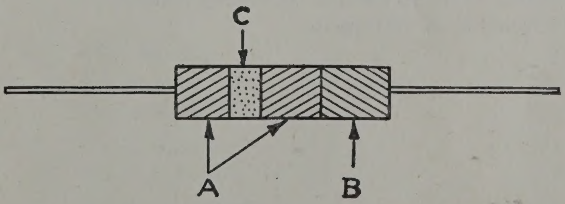
Color	*Significant Figure*	*Decimal Multiplier*	*Tolerance*	*Voltage Rating*
Black	0	1	—	—
Brown	1	10	1%	100 Volts
Red	2	100	2%	200 Volts
Orange	3	1,000	—	300 Volts
Yellow	4	10,000	—	400 Volts
Green	5	100,000	5%	500 Volts
Blue	6	1,000,000	—	600 Volts
Violet	7	10,000,000	—	700 Volts
Gray	8	100,000,000	—	800 Volts
White	9	1,000,000,000	—	—
Gold	—	0.1	5%	—
Silver	—	0.01	10%	—
No Color	—	—	20%	500 Volts

RESISTORS

The nominal resistance value of fixed composition resistors is indicated in two manners. The one in most common use indicates the value by bands of color, as follows:



Band A indicates the first significant figure of the resistance of the resistor.
Band B indicates the second significant figure.
Band C indicates the decimal multiplier.
Band D, if any, indicates the tolerance limits about the nominal resistance value.
The least common system used for indicating nominal resistance value is as follows:



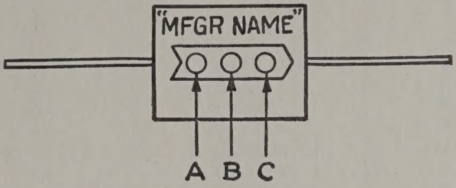
The body (A) of the resistor is colored to represent the first significant figure of the resistance value. One end (B) is colored to represent the second significant figure, and a band or dot (C) of color, located within the body color, indicates the decimal multiplier.

APPENDIX

CAPACITORS

Two systems for color coding small fixed capacitors are in use. In either case, capacity is expressed in micromicrofarads, and some means to avoid ambiguity in interpretation of colors is provided. An arrow pointing from left to right, or the manufacturer's name is generally used.

In general, capacitors having a working voltage of 500 volts are coded by means of three dots of color as follows:



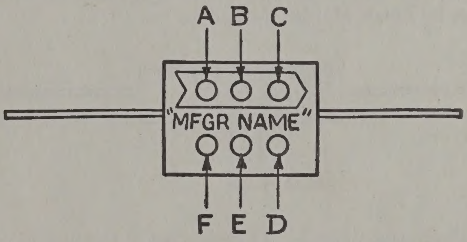
Dot A indicates the first significant figure of the capacitance of the capacitor.

Dot B indicates the second significant figure.

Dot C indicates the decimal multiplier.

An additional dot is sometimes shown when the working voltage is other than 500 volts. This dot indicates the voltage rating of the condenser.

A second system now coming into common use involves six dots of color as follows:



Dot A indicates the first significant figure of the capacitance of the capacitor.

Dot B indicates the second significant figure.

Dot C indicates the third significant figure.

Dot D indicates the decimal multiplier.

Dot E indicates the tolerance about the nominal capacitance value.

Dot F indicates the voltage rating of the capacitor.

APPENDIX

17. ADDRESSES OF MANUFACTURERS

Abbreviation	*Manufacturer*	*Address*
Acme	Acme Industrial Co.	200 W. Lafflin St. Chicago, Ill.
Aero	Aerovox Corp.	New Bedford, Mass.
Amphenol	American Phenolic Corp.	1250 Van Buren St. Chicago, Ill.
Bendix	Bendix Radio Division Bendix Aviation Corp.	Baltimore, Md.
Bussman	Bussman Mfg. Co.	University At Jefferson St. Louis, Mo.
Cardwell	Allen D. Cardwell Mfg. Co.	81 Prospect St. Brooklyn, N. Y.
C. D.	Cornell-Dubilier Corp.	Plainfield, N. J.
Cutler-Hammer	Cutler Hammer, Inc.	10 W. Chase St. Baltimore, Md.
Denyon	Denyon Coil Co.	Caledonia, N. Y.
Erie	Erie Resistor Corp.	Erie, Pa.
General Electric	General Electric Co.	1 River Road Schenectady, N. Y.
General Radio	General Radio Co.	30 State St. Cambridge, Mass.
H.H.	Hardwick & Hindle, Inc.	40 Herman St. Newark, N. J.
H & K	Heintz & Kaufman	S. San Francisco, Calif.
H. R. Kirkland	H. R. Kirkland Co.	Morristown, N. J.
Int. Tel.	International Telephone	67 Broad St. New York, N. Y.
IRC	International Resistance Co.	Philadelphia, Pa.
Johnson Co.	E. F. Johnson Co.	Waseca, Minn.
Micamold	Micamold Radio Corp.	1087 Flushing Ave. Brooklyn, N. Y.
Oak	Oak Mfg. Co.	1260 Clybourne Ave. Chicago, Ill.
Pass & Seymour	Pass & Seymour Inc.	Syracuse, N. Y.
RCA	R.C.A. Radiotron Div. R.C.A. Mfg. Co., Inc.	401 Bergen St. Harrison, N. J.
Stromberg Carlson	Stromberg Carlson	Rochester, N. Y.
Western Electric	Western Electric Co.	300 Central Ave. Kearney, N. J.
Weston	Weston Electrical Instrument Corp.	Newark, N. J.

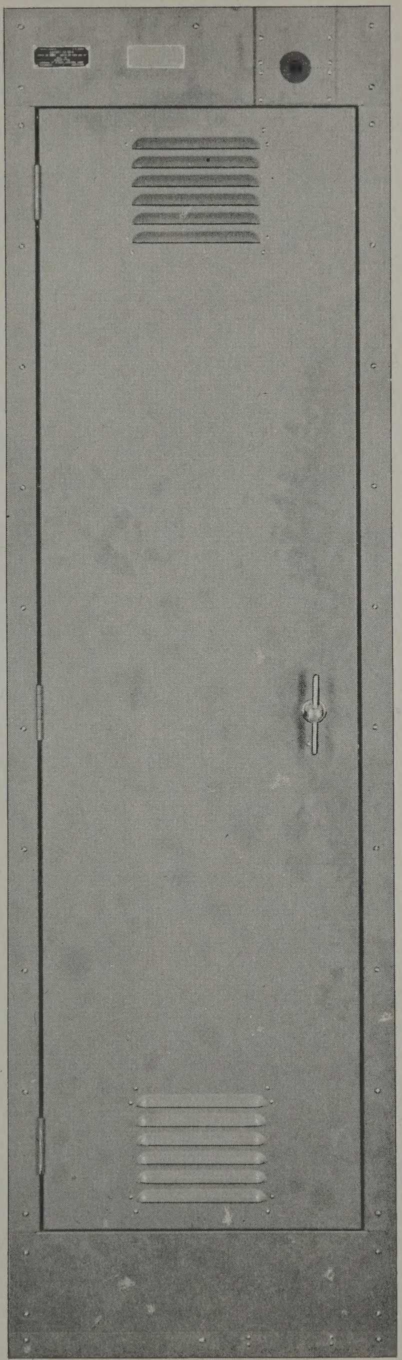


Figure 2—Radio Transmitter BC-640-A, Rear View

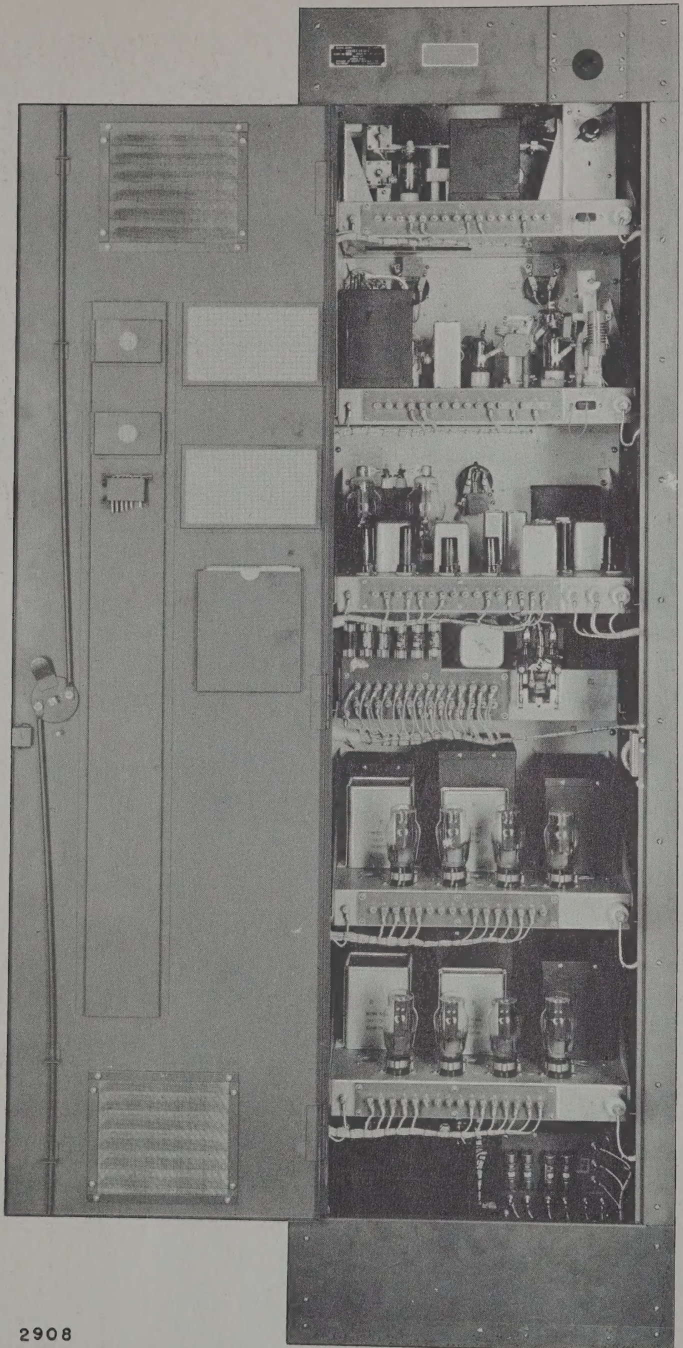
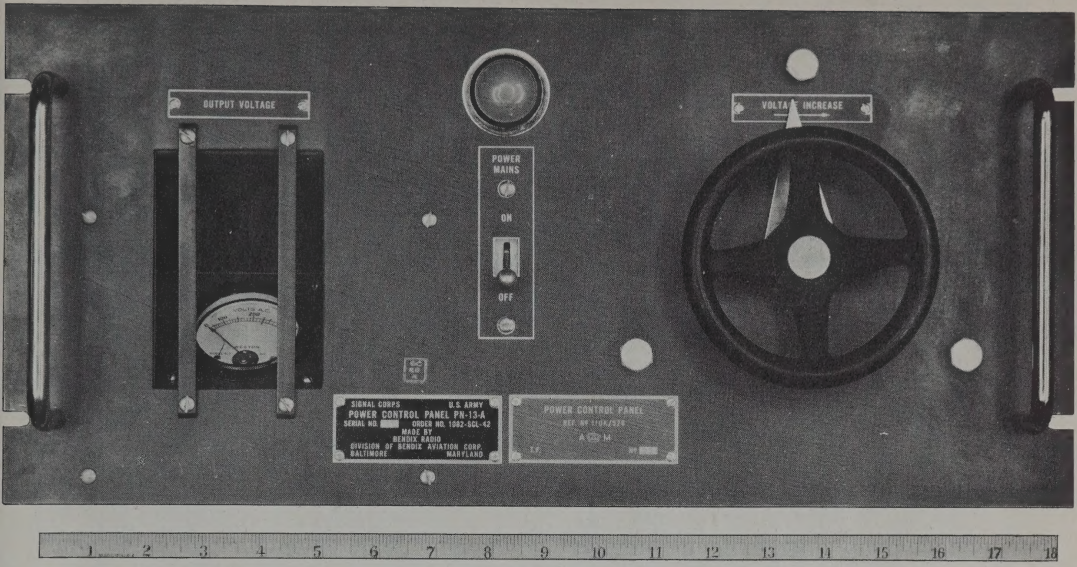
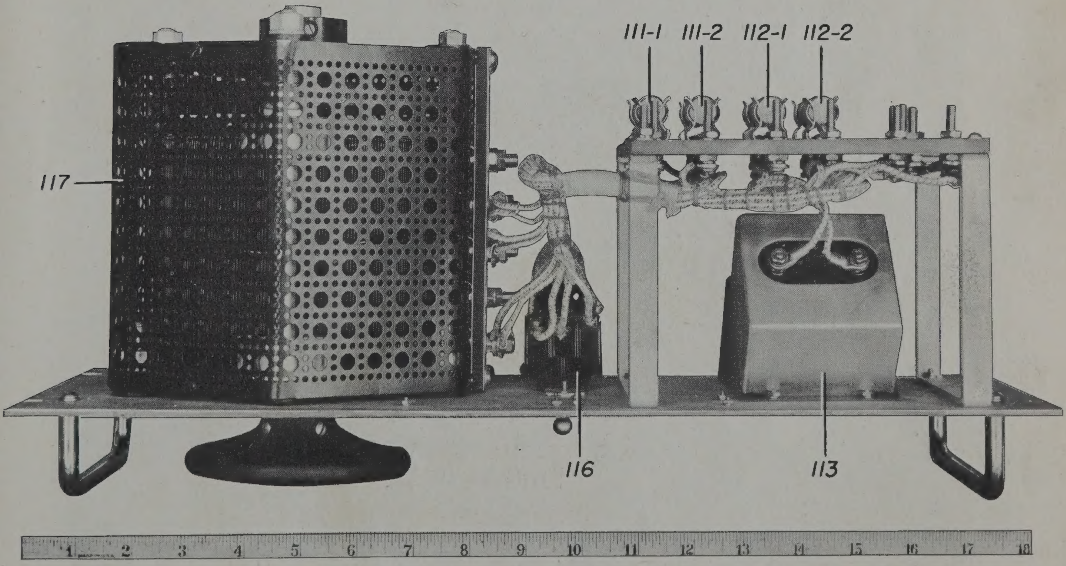


Figure 3—Radio Transmitter BC-640-A, Rear View, Door Open


OUTPUT VOLTAGE
POWER MAINS
ON
OFF
VOLTAGE INCREASE
SIGNAL CORPS U.S. ARMY
POWER CONTROL PANEL PN-13-A
SERIAL NO. [redacted] ORDER NO. 1082-SCL-42
MADE BY
BENDIX RADIO
DIVISION OF BENDIX AVIATION CORP.
BALTIMORE MARYLAND
POWER CONTROL PANEL
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

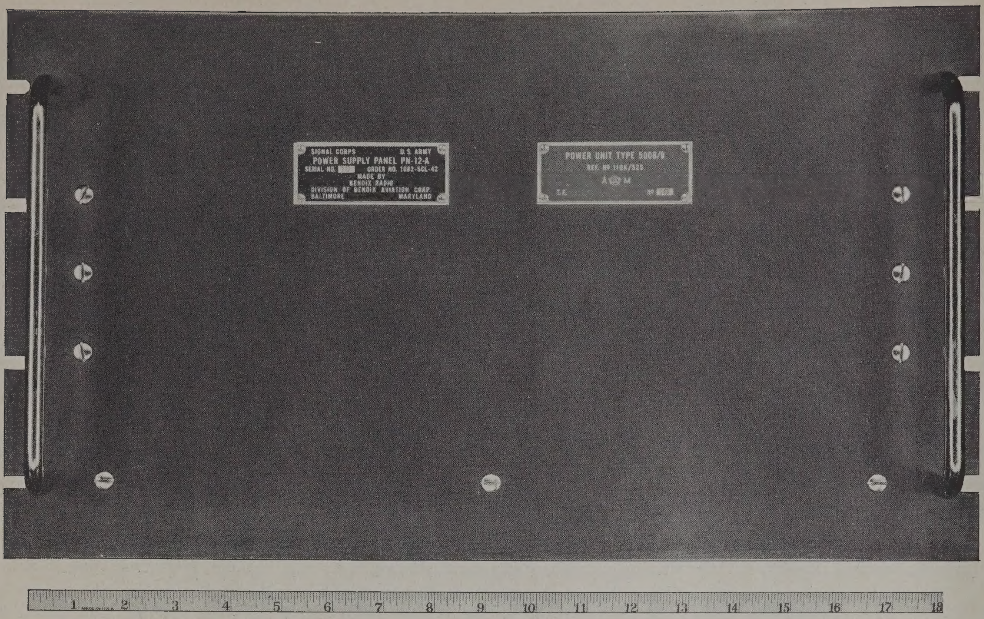
3276

FIGURE 4—POWER CONTROL PANEL PN-13-A, FRONT VIEW


111-1
111-2
112-1
112-2
117
116
113
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

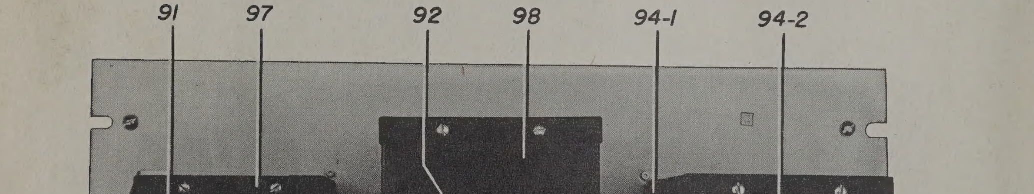
3277

FIGURE 5—POWER CONTROL PANEL PN-13-A, INTERIOR VIEW


SIGNAL CORPS U.S. ARMY
POWER SUPPLY PANEL PN-12-A
SERIAL NO. [redacted] ORDER NO. 1082-SCL-42
MADE BY
BENDIX RADIO
DIVISION OF BENDIX AVIATION CORP.
BALTIMORE MARYLAND
POWER UNIT TYPE 5008/9
REF. Nº 110K/525
A M
T.K.
Nº [redacted]

2919

FIGURE 6—POWER SUPPLY PANEL PN-12-A, FRONT VIEW


91
97
92
98
94-1
94-2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
VT-145

2921

FIGURE 7—POWER SUPPLY PANEL PN-12-A, REAR VIEW

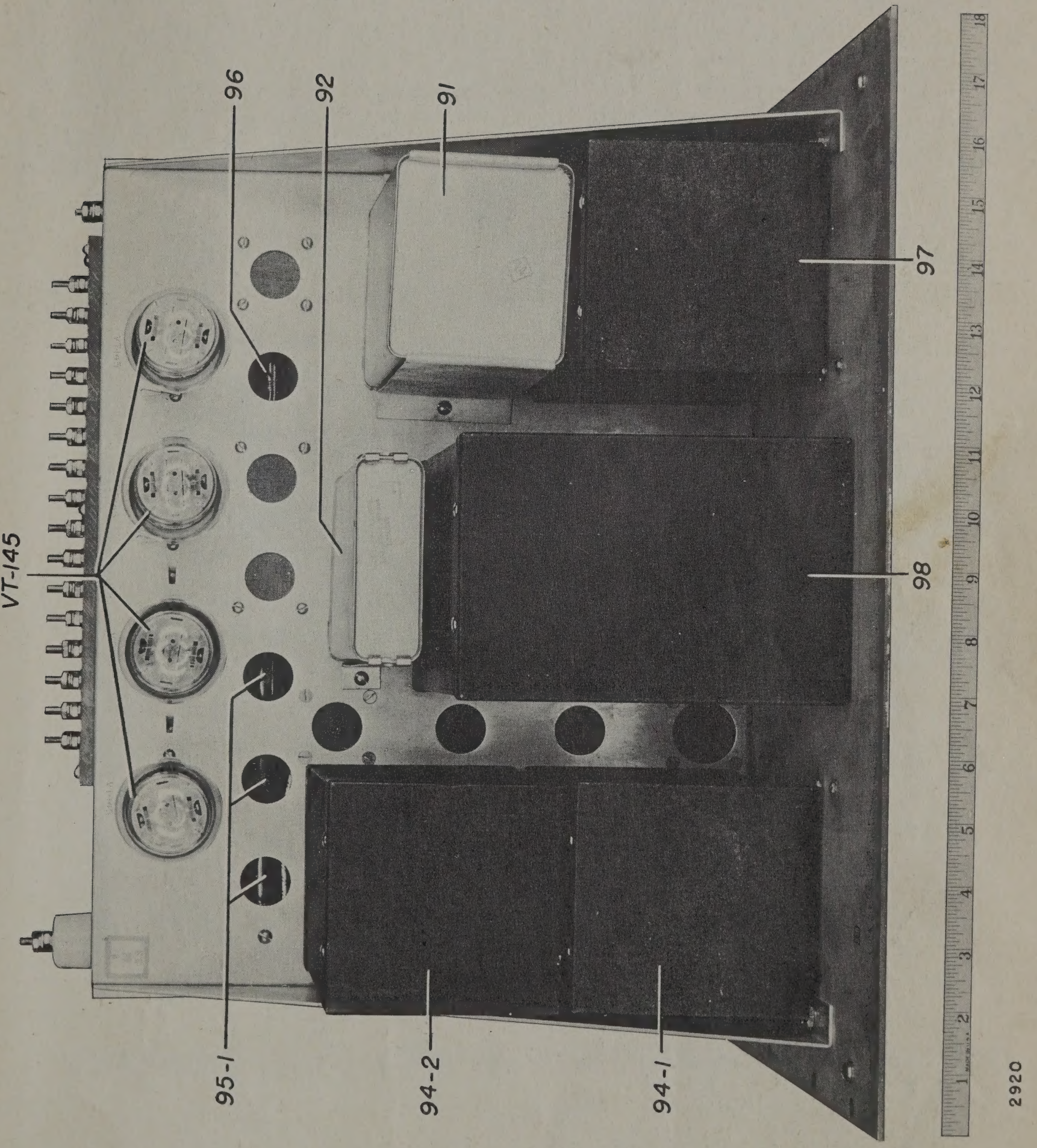

VT-145
96
92
91
97
98
95-1
94-2
94-1
2920

Figure 8—Power Supply Panel PN-12-A, Top View

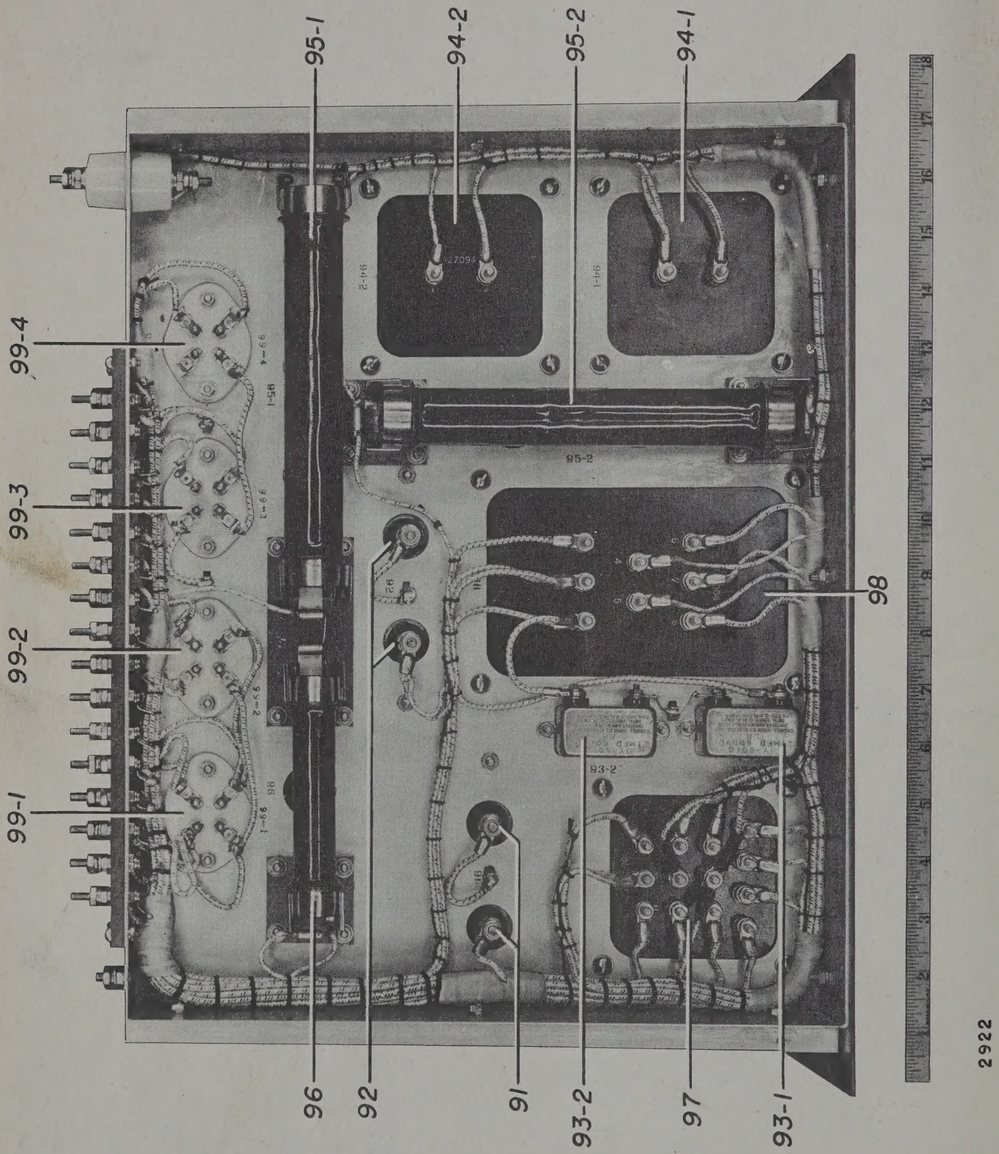

95-1
94-2
95-2
94-1
99-4
99-3
99-2
99-1
98
96
92
91
93-2
97
93-1
2922

Figure 9—Power Supply Panel PN-12-A, Bottom View

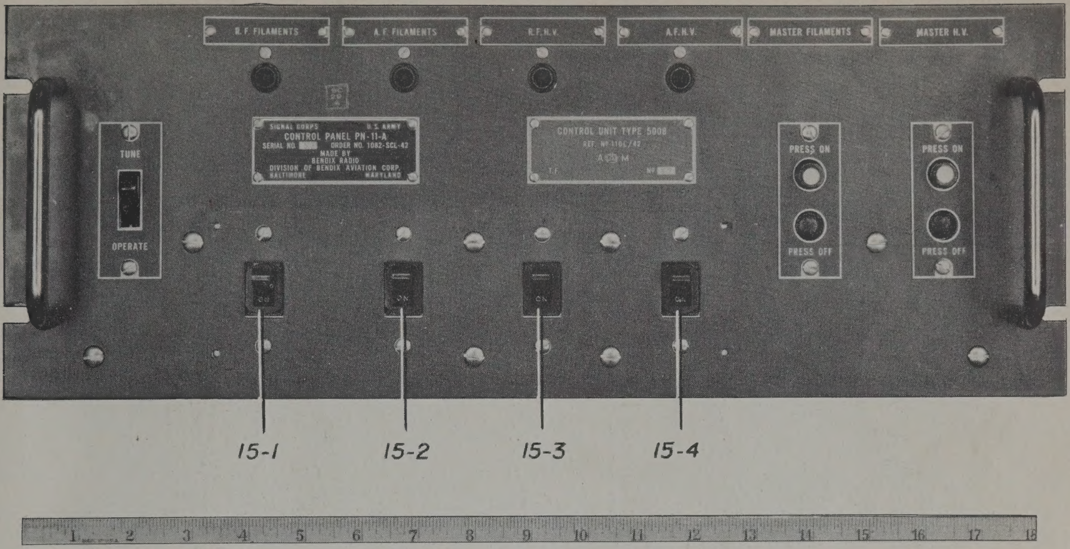

R.F. FILAMENTS
A.F. FILAMENTS
R.F.H.V.
A.F.H.V.
MASTER FILAMENTS
MASTER H.V.
TUNE
OPERATE
SIGNAL CORPS U.S. ARMY
CONTROL PANEL PN-11-A
ORDER NO. 1082-SCL-42
MADE BY
BENDIX RADIO
DIVISION OF BENDIX AVIATION CORP.
BALTIMORE MARYLAND
CONTROL UNIT TYPE 5008
PRESS ON
PRESS OFF
PRESS ON
PRESS OFF
ON
ON
ON
ON
15-1
15-2
15-3
15-4
3271

Figure 10—Control Panel PN-11-A, Front View

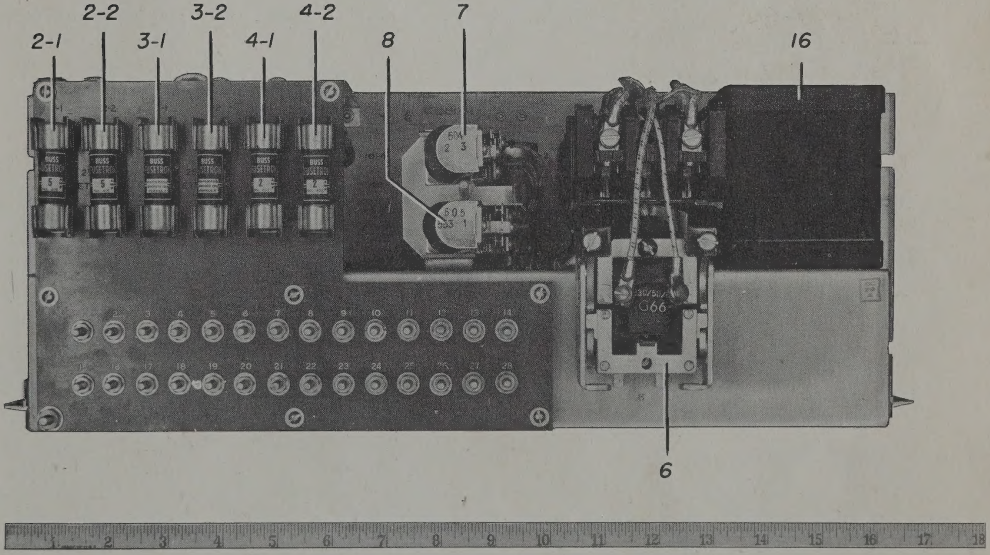
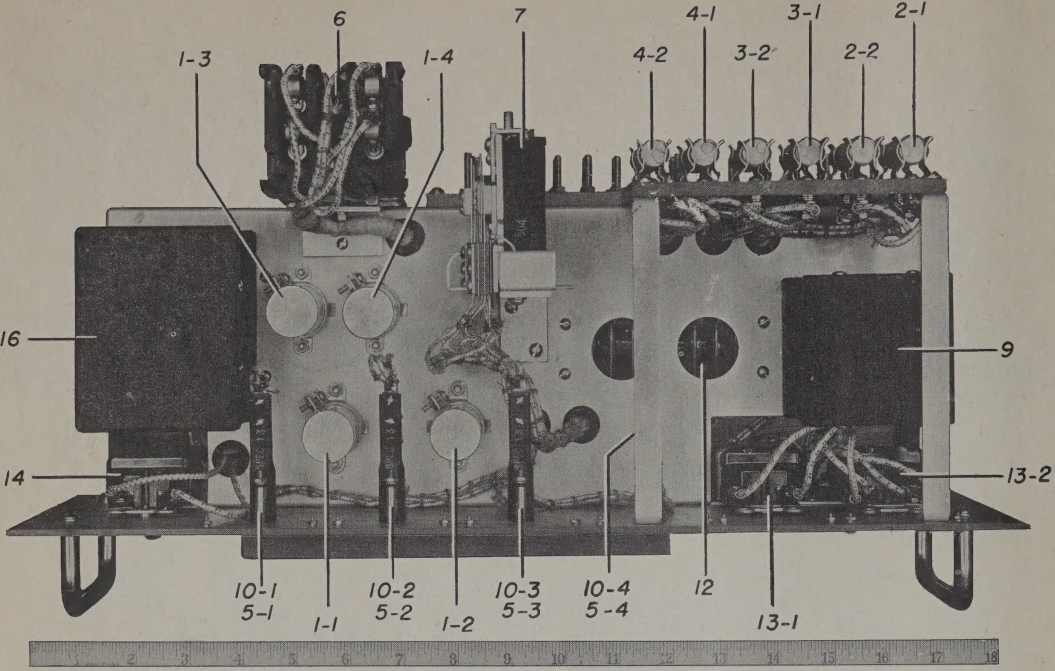
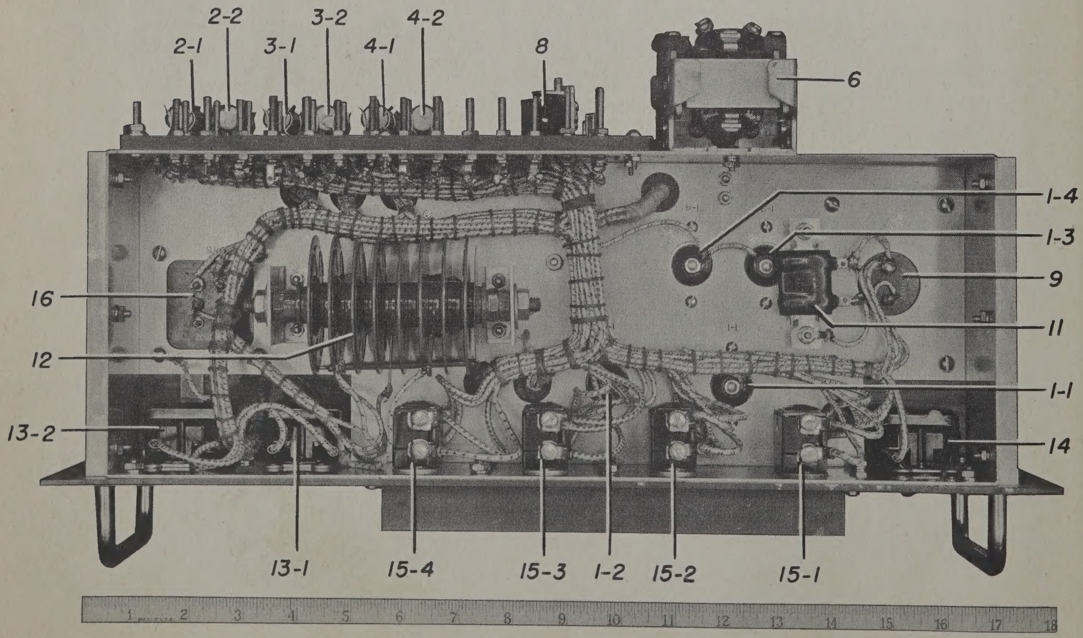

2-1
2-2
3-1
3-2
4-1
4-2
8
7
16
6
3274

Figure 11—Control Panel PN-11-A, Rear View


6
7
4-1
3-1
2-1
1-3
1-4
4-2
3-2
2-2
16
9
14
13-2
10-1
5-1
1-1
10-2
5-2
1-2
10-3
5-3
10-4
5-4
12
13-1

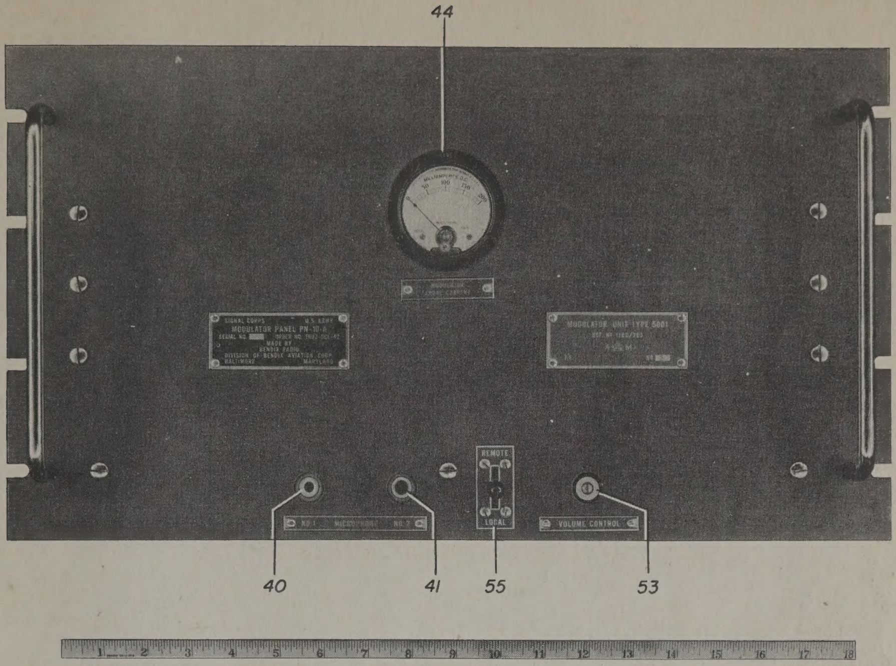
3273

FIGURE 12—CONTROL PANEL PN-11-A, TOP VIEW


2-2
3-2
4-2
2-1
3-1
4-1
8
6
1-4
1-3
9
11
16
12
1-1
13-2
14
13-1
15-4
15-3
1-2
15-2
15-1

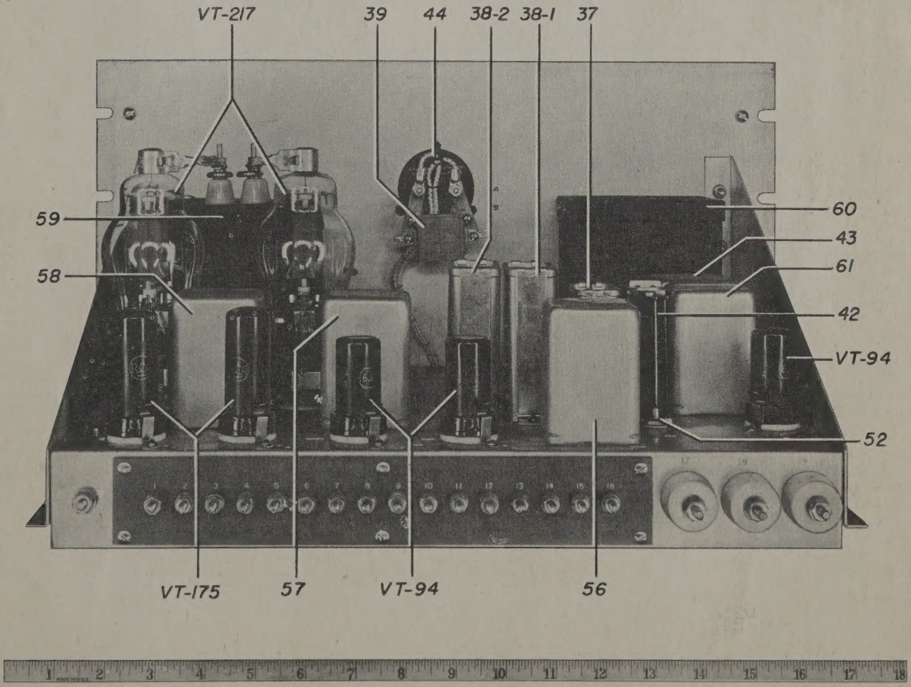
3275

FIGURE 13—CONTROL PANEL PN-11-A, BOTTOM VIEW


44
40
41
55
53
REMOTE
LOCAL
NO. 1 MICROPHONE NO. 2
VOLUME CONTROL
MODULATOR PANEL PN-10-A
MODULATOR UNIT TYPE 5001

2915

FIGURE 14—MODULATOR PANEL PN-10-A, FRONT VIEW


VT-217
39
44
38-2
38-1
37
59
58
60
43
61
42
VT-94
52
VT-175
57
VT-94
56

2917

FIGURE 15—MODULATOR PANEL PN-10-A, REAR VIEW

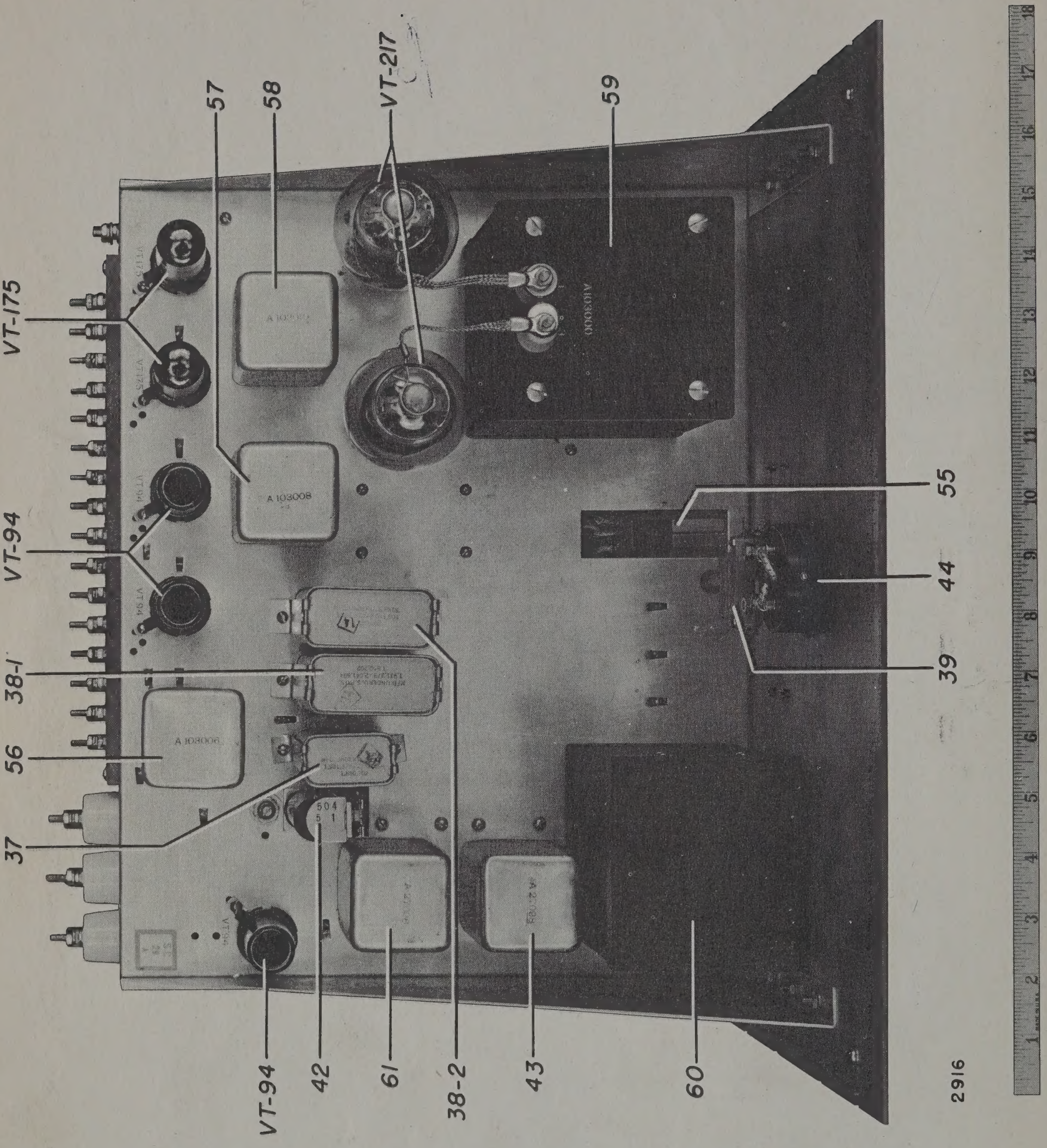

VT-175
VT-94
38-1
56
37
57
58
VT-217
59
55
44
39
VT-94
42
61
38-2
43
60
2916
A 103008
A 103006
A 103000

FIGURE 16—MODULATOR PANEL PN-10-A, TOP VIEW

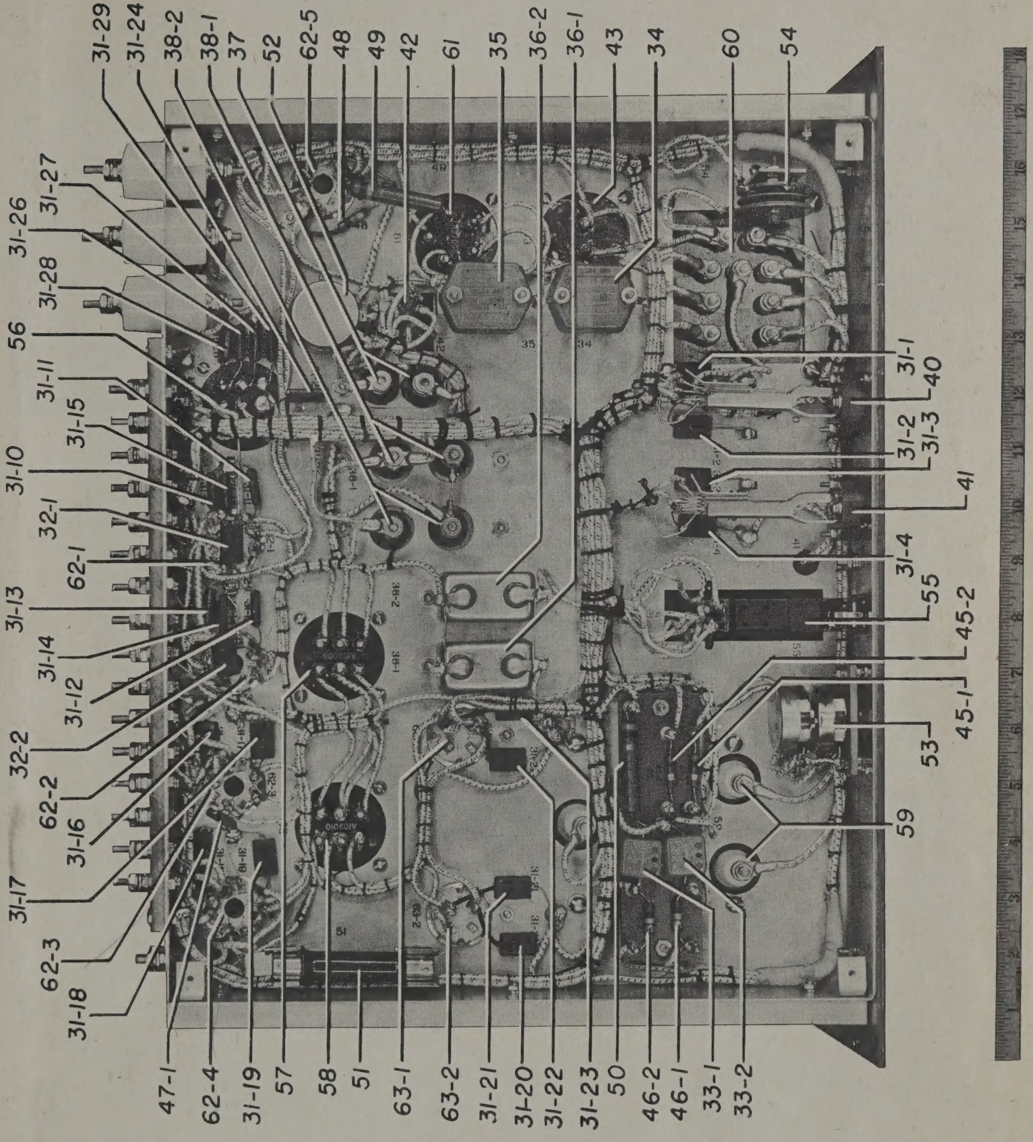
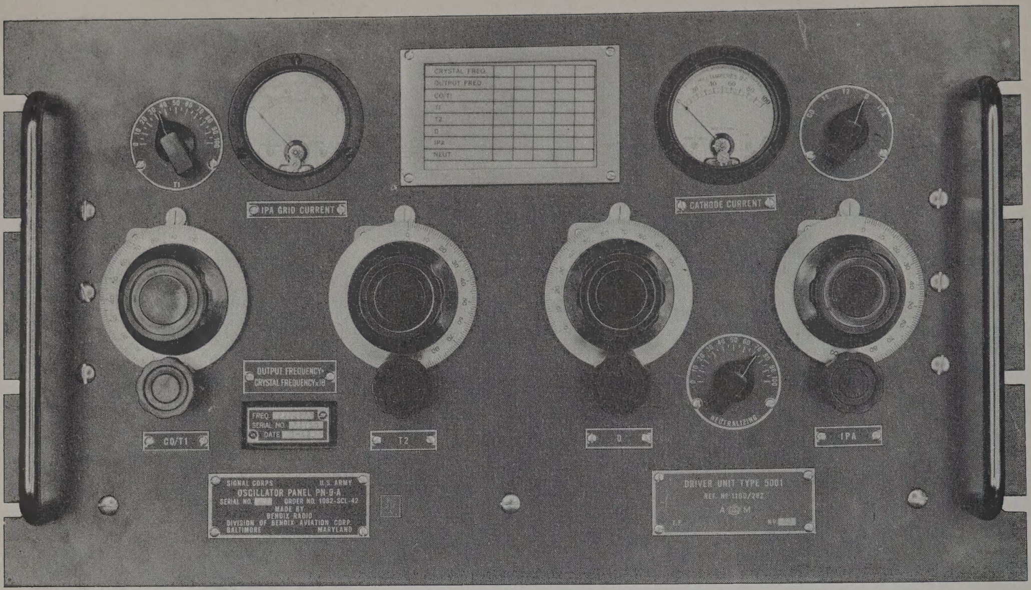
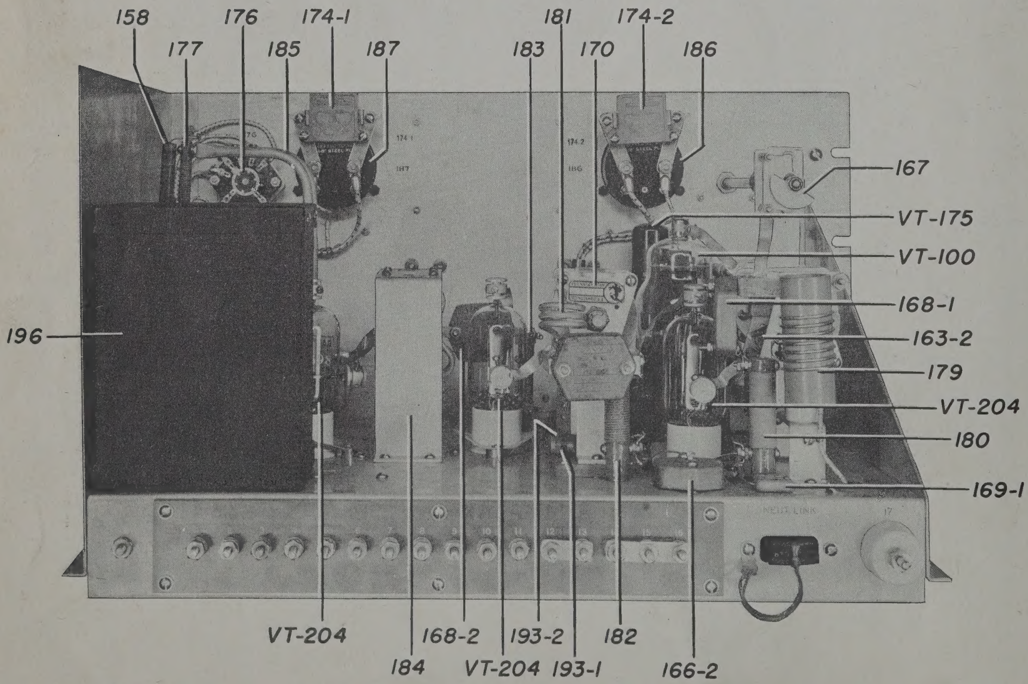

31-29
31-24
38-2
38-1
37
52
62-5
48
49
42
61
35
36-2
36-1
43
34
60
54
31-26
31-27
31-28
56
31-11
31-15
31-10
32-1
62-1
31-13
31-14
31-12
32-2
62-2
31-16
31-17
62-3
31-18
47-1
62-4
31-19
57
58
51
63-1
63-2
31-21
31-20
31-22
31-23
50
46-2
46-1
33-1
33-2
31-1
40
31-2
31-3
41
31-4
55
45-2
45-1
53
59
2918

Figure 17—Modulator Panel PN-10-A, Bottom View


CRYSTAL FREQ.
OUTPUT FREQ.
CO/T1
T1
T2
D
IPA
NEUT
T1
IPA GRID CURRENT
CATHODE CURRENT
OUTPUT FREQUENCY= CRYSTAL FREQUENCY×18
FREQ.
SERIAL NO.
DATE
CO/T1
T2
D
NEUTRALIZING
IPA
SIGNAL CORPS U.S. ARMY
OSCILLATOR PANEL PN-9-A
SERIAL NO. ORDER NO. 1082-SCL-42
MADE BY
BENDIX RADIO
DIVISION OF BENDIX AVIATION CORP.
BALTIMORE MARYLAND
DRIVER UNIT TYPE 5001
REF. NO 1180/282

3266

Figure 18—Oscillator Panel PN-9-A, Front View


158
176
174-1
181
174-2
177
185
187
183
170
186
167
VT-175
VT-100
168-1
196
163-2
179
VT-204
180
169-1
VT-204
168-2
193-2
182
184
VT-204
193-1
166-2
NEUT. LINK

3269

Figure 19—Oscillator Panel PN-9-A, Rear View

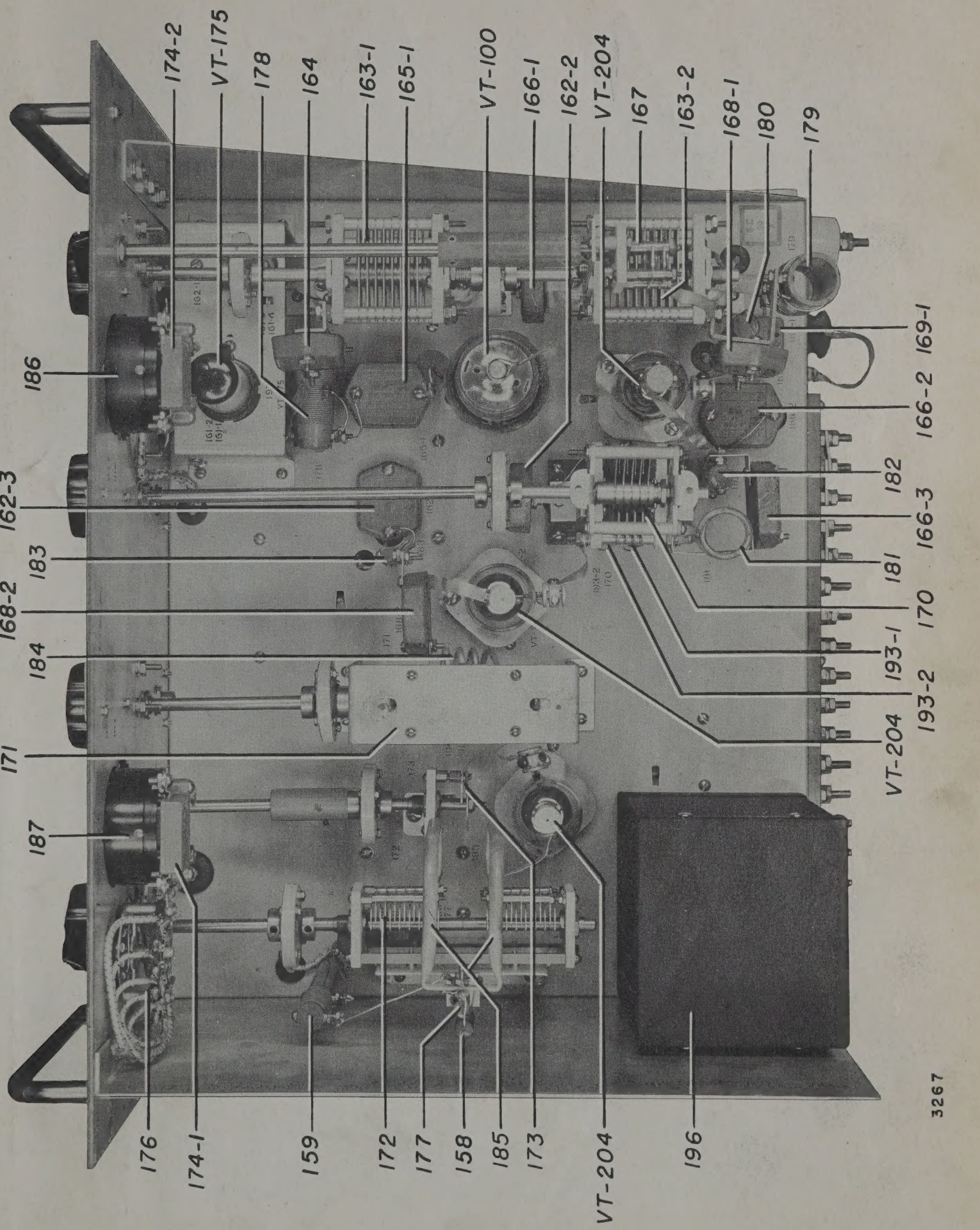

174-2
VT-175
178
164
163-1
165-1
VT-100
166-1
162-2
VT-204
167
163-2
168-1
180
179
169-1
166-2
182
166-3
181
170
193-1
193-2
VT-204
186
162-3
183
168-2
184
171
187
176
174-1
159
172
177
158
185
173
VT-204
196
3267

FIGURE 20—OSCILLATOR PANEL PN-9-A, TOP VIEW

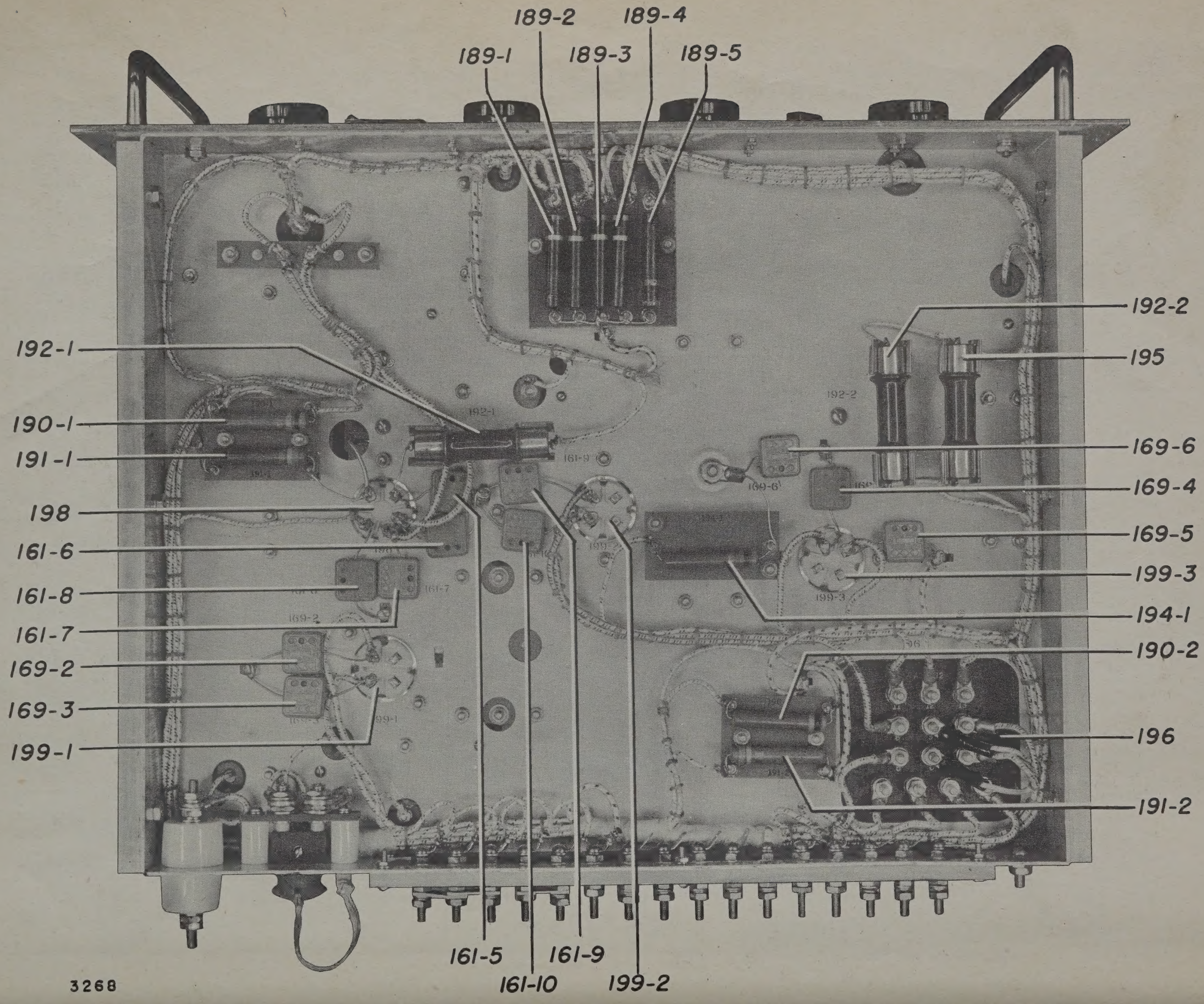

189-2
189-4
189-1
189-3
189-5
192-2
195
192-1
190-1
191-1
169-6
169-4
198
169-5
161-6
199-3
161-8
194-1
161-7
190-2
169-2
169-3
196
199-1
191-2
161-5
161-9
161-10
199-2
3268

FIGURE 21—OSCILLATOR PANEL PN-9-A, BOTTOM VIEW

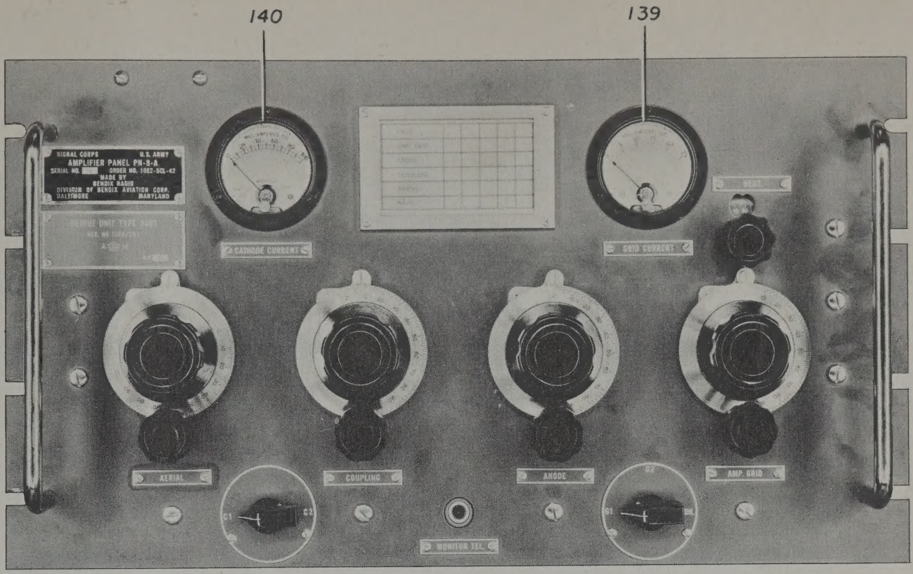

140
139
SIGNAL CORPS U.S. ARMY
AMPLIFIER PANEL PN-8-A
SERIAL NO. ORDER NO. 1082-SCL-42
MADE BY
BENDIX RADIO
DIVISION OF BENDIX AVIATION CORP.
BALTIMORE MARYLAND
CATHODE CURRENT
GRID CURRENT
NEUT.
AERIAL
COUPLING
ANODE
AMP. GRID
C1
C2
MONITOR TEL.
2909

Figure 22—Amplifier Panel PN-8-A, Front View

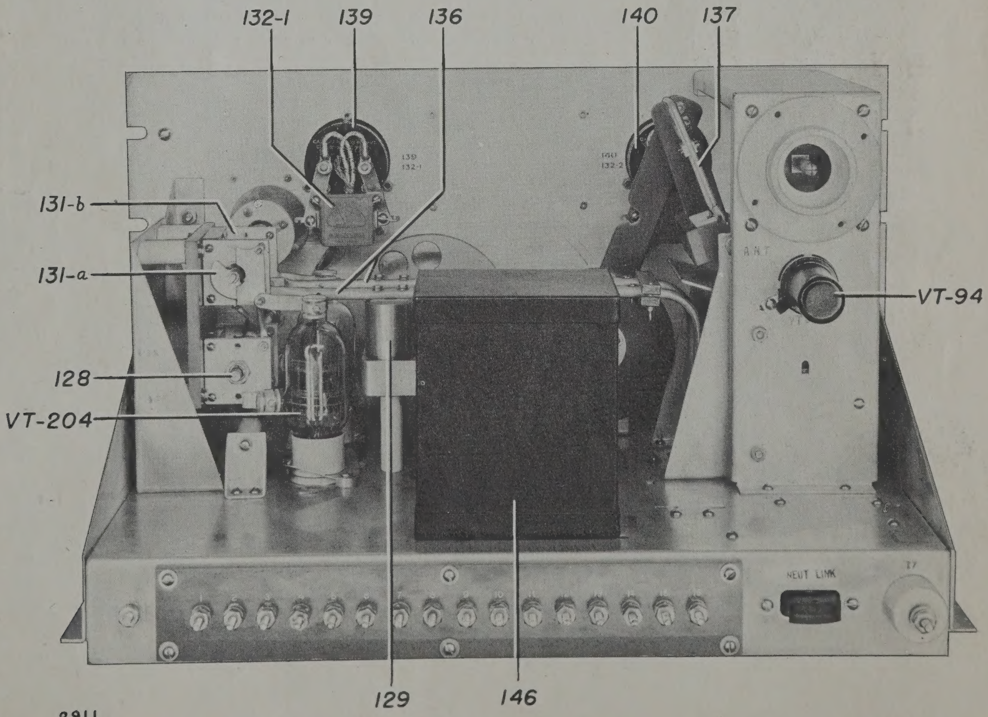

132-1
139
136
140
137
131-b
131-a
128
VT-204
VT-94
ANT.
NEUT LINK
129
146
2911

Figure 23—Amplifier Panel PN-8-A, Rear View

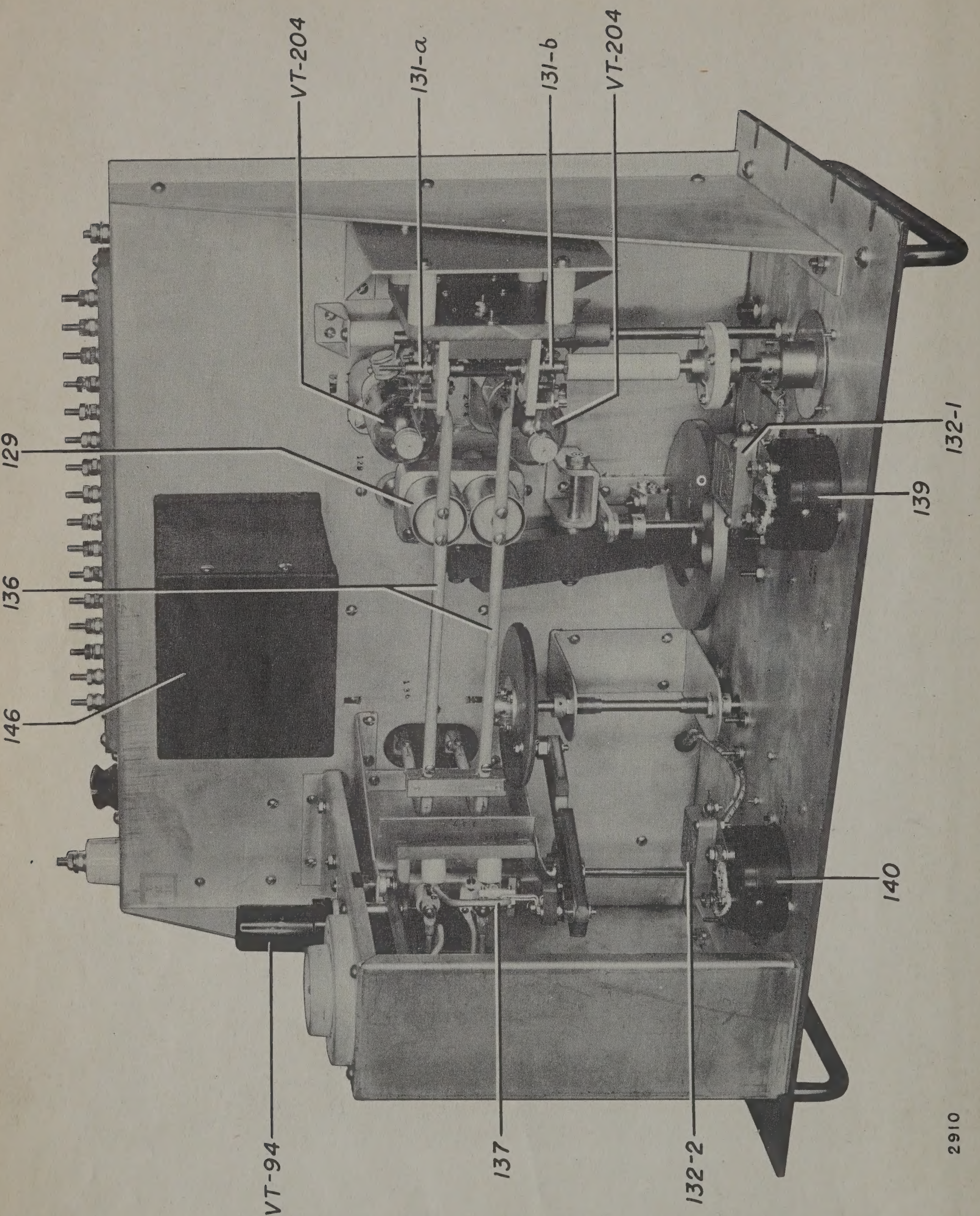

VT-204
131-a
131-b
VT-204
129
136
146
132-1
139
140
VT-94
137
132-2
2910

FIGURE 24—AMPLIFIER PANEL PN-8-A, TOP VIEW

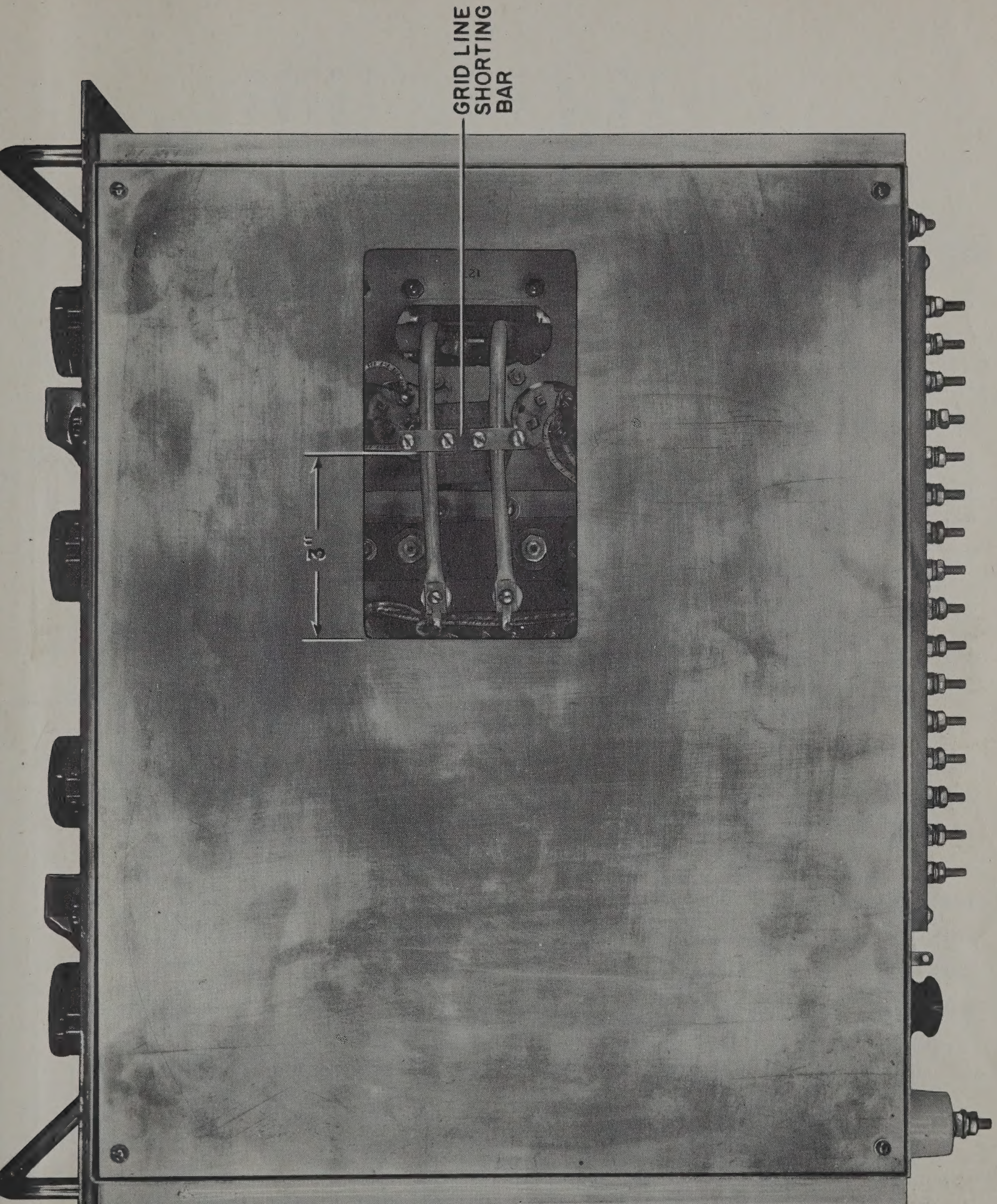

GRID LINE SHORTING BAR
3"
2912

Figure 25—Amplifier Panel PN-8-A, Bottom View With Cover On

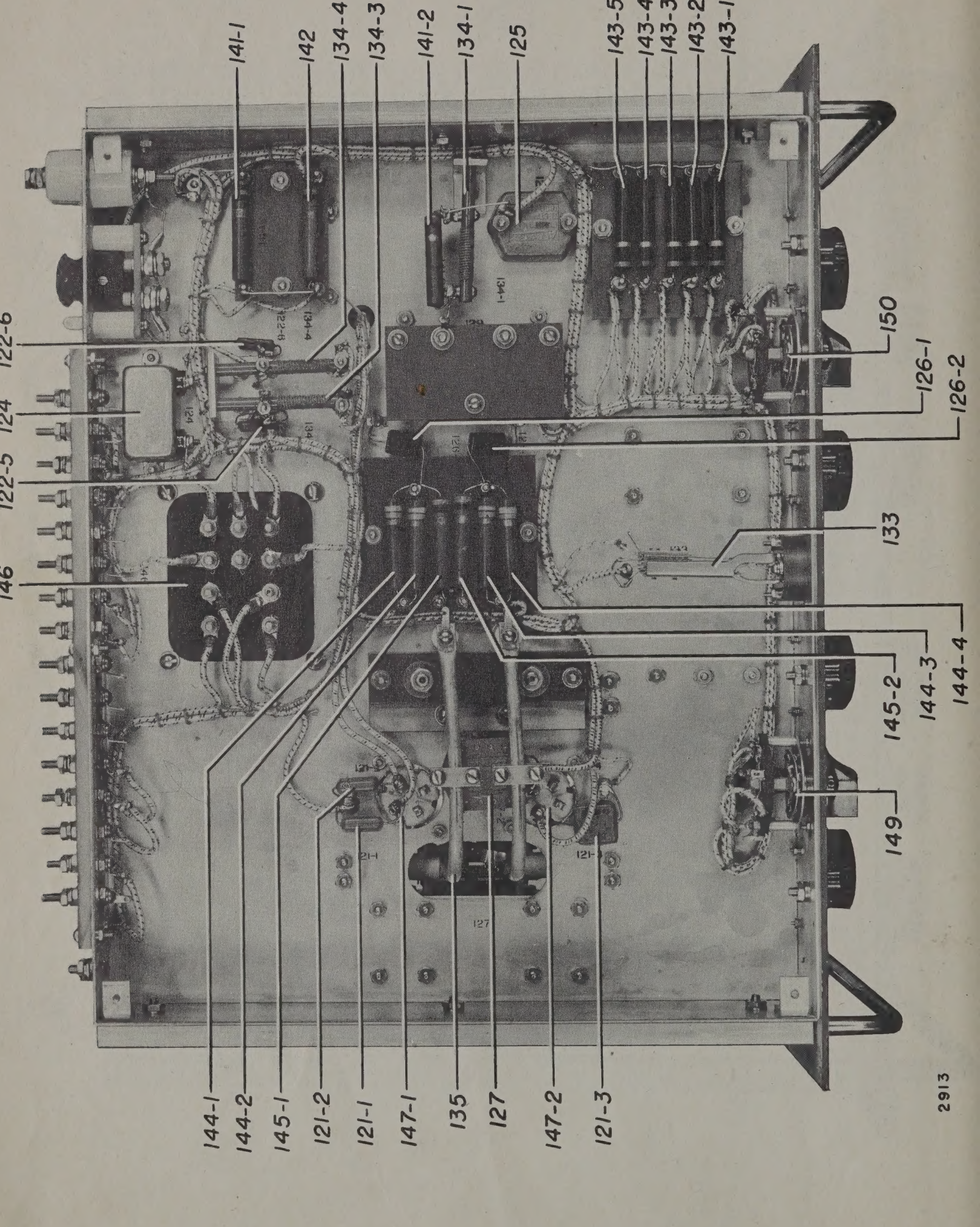

122-6
124
122-5
146
141-1
142
134-4
134-3
141-2
134-1
125
143-5
143-4
143-3
143-2
143-1
150
126-1
126-2
133
145-2
144-3
144-4
149
144-1
144-2
145-1
121-2
121-1
147-1
135
127
147-2
121-3
2913

Figure 26—Amplifier Panel PN-8-A, Bottom View With Cover Off

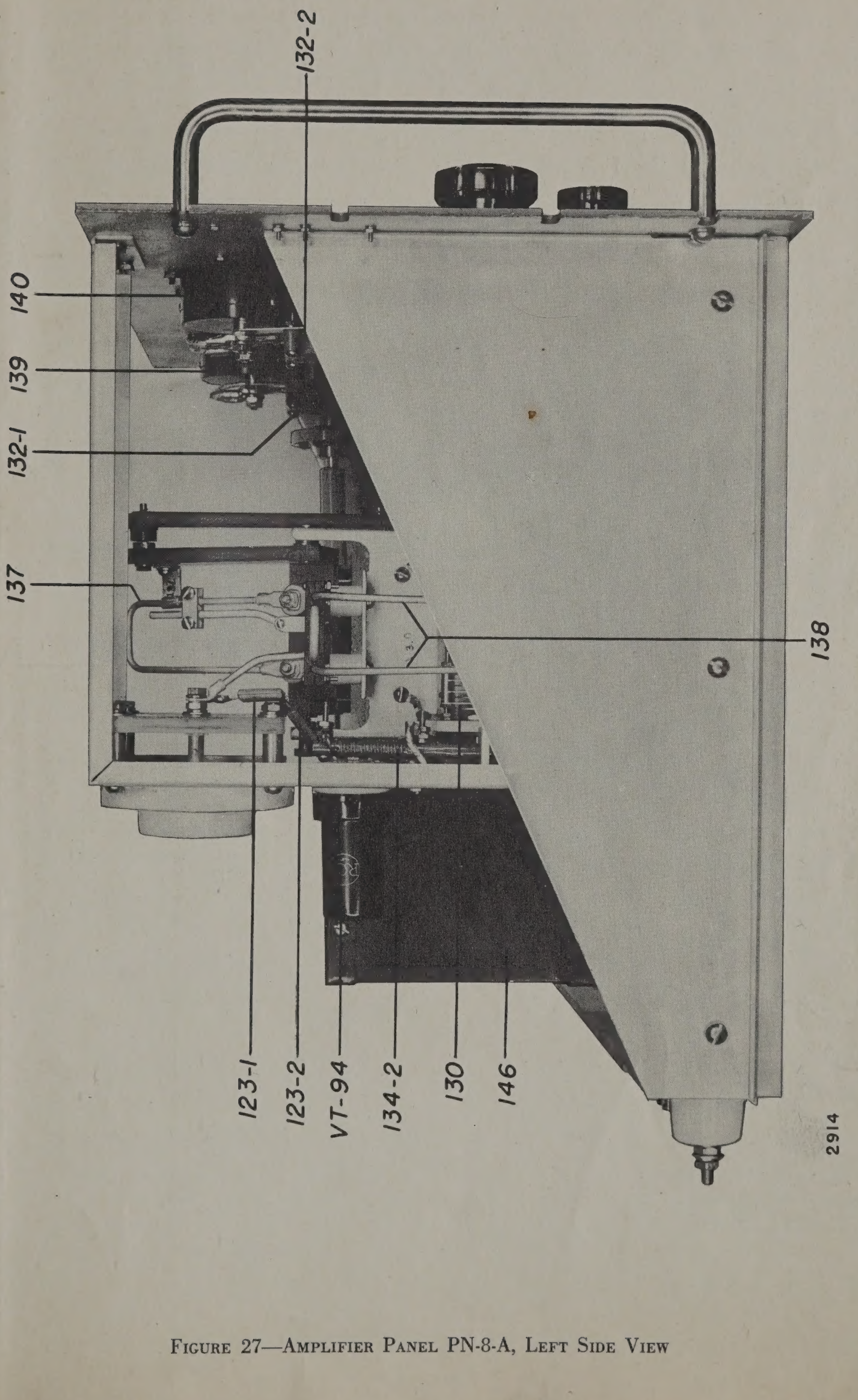

132-2
140
139
132-1
137
138
123-1
123-2
VT-94
134-2
130
146
2914

Figure 27—Amplifier Panel PN-8-A, Left Side View

Test No.	*Voltage Across Terminals*	*Additional Test Conditions*	*Volts*	*Probable Cause of Incorrect Reading*
19	14 and 16 of lower PN-12-A.		395 d-c	Same as 18. Open choke 94-2.
20	14 and 15 of lower PN-12-A.		315 d-c	Same as 19. Defective resistor 96.
21	2 and 3 of upper PN-12-A.		230 a-c	Same as 11. Defective wiring between terminals 2 and 3 of upper power supply panel.
22	4 and 5 of upper PN-12-A.		230 a-c	Same as 8. Defective wiring between terminals 4 and 5 of upper power supply panel and 3 and 4 of the control panel.
23	9 and 10 of PN-11-A.		4 a-c	Same as 21. Defective plate transformer 98 of upper power supply panel. Defective wiring between terminals 12 and 13 of upper power supply panel and 9 and 10 of the control panel.
24	5 and 6 of PN-11-A.		4 a-c	Same as 22. Defective filament transformer 97, defective wiring between terminals 10 and 11 of PN-12-A and 5 and 6 of the control panel.
25	14 and 17 of upper PN-12-A		850 d-c	Same as 21 and 22. Defective Tubes VT-145, open choke 94-1, shorted capacitor 91 or 92, shorted external circuit. Remove and check external wiring.
26	14 and 15 of upper PN-12-A.		260 d-c	Defective resistor 96.
27	4 and 5 of PN-10-A.		230 a-c	Same as 8. Defective wiring between terminals 13 and 14 of PN-11-A and 4 and 5 of the modulator panel.
28	15 and 16 of PN-10-A.		24 d-c	Same as 13. Defective wiring between terminals 15 and 16 of modulator panel and 23 and 24 of PN-11-A.
29	36 and 37 of cabinet terminal board.		24 d-c	Same as 28. Defective wiring between terminals 13 and 14 on PN-10-A and 36 and 37 on cabinet terminal board. Defective microphone transformer 56 in the modulator panel. Defective REMOTE-LOCAL switch 55 in the modulator panel.
30	2 and 7 of PN-10-A.		260 d-c	Same as 27. Defective wiring between terminals 14 and 15 of upper PN-12-A and terminals 2 and 7 of the modulator panel.
31	2 and 17 of PN-10-A.		850 d-c	Same as 25. Defective wiring between terminal 17 of modulator panel and 17 of upper PN-12-A.
32	2 and 18 of PN-10-A.		800 d-c	Same as 18. Defective wiring between terminal 18 of modulator panel and 17 of lower PN-12-A. Short circuit in transformer 59 in modulator panel or defective wiring to transformer.

Test No.	*Voltage Across Terminals*	*Additional Test Conditions*	*Volts*	*Probable Cause of Incorrect Reading*
33	2 and 19 of PN-10-A.		800 d-c	Same as 32. Open secondary of transformer 59 of modulator panel.
34	4 and 5 of PN-9-A.		230 a-c	Same as 7. Defective wiring between terminals 11 and 12 of PN-11-A and 4 and 5 of PN-9-A.
35	12 and 13 of PN-9-A.		0 d-c	Broken jumper between terminals 12 and 13 of the oscillator panel.
36	11 and 13 of PN-9-A.		315 d-c	Same as 20. Defective wiring between terminals 14 and 15 on lower PN-12-A and 11 and 13 on oscillator panel.
37	11 and 14 of PN-9-A.		395 d-c	Same as 19. Defective wiring between terminals 14 and 16 of lower PN-12-A and 11 and 14 of oscillator panel.
38	14 and 15 on PN-9-A.		0 d-c	Broken or open jumper between terminals 14 and 15 of oscillator panel.
39	14 and 16 on PN-9-A.		0 d-c	Same as 38. Broken jumper between terminals 15 and 16 of oscillator panel.
40	11 and 17 on PN-9-A.		800 d-c	Same as 18. Defective wiring between terminals 17 of lower PN-12-A and 17 of oscillator panel.
41	4 and 5 of PN-8-A.		230 a-c	Same as 34. Defective wiring between terminals 4 and 5 of the amplifier panel and terminals 4 and 5 of PN-9-A.
42	2 and 17 of PN-8-A.		800 d-c	Same as 33. Defective wiring between terminals 19 of PN-10-A and 17 of amplifier panel.
43	9 and 10 of PN-8-A.	Transmitter tone-modulated 100%	More than 1 a-c	Open resistor 141-1, open choke 134-2,-3,-4. Defective Tube VT-94, defective capacitor 123-1, 123-2, or 124.
44	Jack 133 of PN-8-A.	Transmitter tone-modulated 100%	More than 1.5 a-c	Open resistor 141-1, open choke 134-2, -3, -4. Defective Tube VT-94, capacitor 123-1 or 123-2. Defective jack 133, open resistor 142.

14. VACUUM TUBE SOCKET VOLTAGES AND RESISTANCES

a. General

The following paragraphs contain directions for measuring vacuum tube socket voltages and resistances, using an RCA VoltOhmyst Junior. Correct voltage and resistance values are listed below, and if the measured values are found to vary by more than ±10%, it is sufficient cause for investigating the condition of the tube or circuit in question. The method of removing tubes for test or replacement is obvious from inspection except in the case of Tubes VT-204 contained in Oscillator Panel PN-9-A.

To remove Tube VT-204 it is first necessary to remove the plate and grid leads. When replacing these tubes, *just barely tighten the screws on these leads.* This is important because it is easy to break the plate or grid lead by exerting excessive pressure on the screw.

b. Power Supply Panel PN-12-A (Lower)

CAUTION: DO NOT ATTEMPT TO MEASURE

FILAMENT VOLTAGE WHILE PLATE VOLTAGE IS APPLIED TO THE RECTIFIER TUBES.

Adjust the VOLTAGE INCREASE control on Power Control Panel PN-13-A until the OUTPUT VOLTAGE meter indicates 230 volts a.c. (red calibration line). However, the indicator will not necessarily be on the red line if a meter correction was made before using the transmitter or making voltage measurements. If the power supply panel is removed from Cabinet CS-88-A for making voltage measurements, connect terminals 15, 16 and 17 to a load, as specified below:

Terminal 15 to chassis: 13,500 ohms, 15 watts.
Terminal 16 to chassis: 3,000 ohms, 75 watts.
Terminal 17 to chassis: 4,300 ohms, 200 watts.

Tube	*Socket*	*Filament Volts (a-c)*
VT-145	99-1	5.0
VT-145	99-2	5.0
VT-145	99-3	5.0
VT-145	99-4	5.0

Terminals	*Volts*	*Scale Used*
*17 to chassis	800 d-c	1000 d-c
16 to chassis	395 d-c	1000 d-c
15 to chassis	315 d-c	1000 d-c
12 to 13	4.0 a-c	10 a-c
10 to 11	4.0 a-c	10 a-c
†17 to chassis	400 d-c	1000 d-c

* A common fault found in Power Supply Panel PN-12-A is a high-voltage breakdown between tube socket and chassis.

† TUNE-OPERATE switch set at TUNE.

NOTE: The following resistance values in *ohms* were measured with the loads removed, and the power supply panel removed from Cabinet CS-88-A. All resistances, were measured from the socket terminal to ground, using the 1000-volt scale of the RCA VoltOhmyst Junior.

Tube	*Socket*	*Filament*	*Plate*
VT-145	99-1	17,500	9,500
VT-145	99-2	17,500	9,500
VT-145	99-3	9,500	Ground
VT-145	99-4	9,500	Ground

Terminals	*Resistance*
15 to chassis	8,000
16 to chassis	9,500
17 to chassis	17,500

c. Power Supply Panel PN-12-A (*Upper*)

CAUTION: DO NOT MEASURE FILAMENT VOLTAGE WHILE PLATE VOLTAGE IS APPLIED TO THE RECTIFIER TUBES. While making voltage measurements, keep the OUTPUT VOLTAGE meter indicating 230 volts a.c. (red line). If the upper power supply panel is removed from Cabinet CS-88-A for making voltage measurements, make the following load connections.

Terminal 17 to chassis: 8500 ohms, 200 watts.
Terminal 15 to chassis: 3700 ohms, 25 watts.

NOTE: Resistance values will be the same as for the lower power supply panel (see Paragraph *b* above).

Tube	*Socket*	*Filament Volts a-c*
VT-145	99-1	5.0
VT-145	99-2	5.0
VT-145	99-3	5.0
VT-145	99-4	5.0

Terminals	*Volts*	*Scale Used*
17 to chassis	850 d-c	1000 d-c
16 to chassis	425 d-c	1000 d-c
15 to chassis	260 d-c	1000 d-c
12 to 13	4.0 a-c	10 a-c
10 to 11	4.0 a-c	10 a-c

NOTE: Terminal 16 not used in upper power supply panel.

d. Modulator Panel PN-10-A

For radio-telephone operation of the transmitter, a U. S. Signal Corps Microphone T-48-A or a British Handset BT-23 may be employed. Plug the handset into the proper microphone jack on Panel PN-10-A. The Signal Corps Microphone T-48-A fits into jack No. 1 and the British Handset BT-23 fits into jack No. 2. If the REMOTE-LOCAL switch is set at REMOTE, either one of these microphones will turn the carrier on or off providing the handset is series connected with a 500-ohm resistor and connected across terminals

36 and 37 of the cabinet terminal board. The transmitter will be modulated 100% at normal voice level with the proper setting of the volume control. The transmitter will key satisfactorily at 30 words per minute, with control 52 full on.

(1) The following voltages were measured from the tube-socket terminals to the chassis with the OUTPUT VOLTAGE meter on Power Control Panel PN-13-A kept constant at 230 volts a.c. and the transmitter unmodulated.

Tube	*Function*	*Socket*	*Heater Voltage*	*Plate Voltage (d-c)*	*Plate Current (ma)**
VT-94	1st Audio	62-1	6.3	240	9
VT-94	1st Audio	62-2	6.3	240	9
VT-175	Driver	62-3	6.3	260	37
VT-175	Driver	62-4	6.3	260	37
VT-217	Modulator	63-1	6.3	850	15
VT-217	Modulator	63-2	6.3	850	15
VT-94	Audio Osc.	62-5	6.3	250	.2

*With 100% modulation a current of 110 ma is indicated on the MODULATOR ANODE CURRENT meter.

(2) The following resistances in ohms were measured from the tube-socket terminals to ground with power turned off and the modulator panel removed from the rack. The audio oscillator volume control and the VOLUME CONTROL were set fully clockwise. [illegible]s not in sockets.

Tube	*Function*	*Socket*	*Heaters*	*Grid*	*Plate*	*Cathode*
VT-94	1st Audio	62-1	—	10,000†	Inf.	500
VT-94	1st Audio	62-2	—	10,000†	Inf.	500
VT-175	Driver	62-3	—	750†	Inf.	300
VT-175	Driver	62-4	—	750†	Inf.	300
VT-217	Modulator	63-1	0.3*	50*	Inf.	—
VT-217	Modulator	63-2	0.3*	50*	Inf.	—
VT-94	Audio Osc.	62-5	0* or .2*	1M‡	Inf.	0

*R X 1 scale.
†R X 100 scale.
‡R X 1000 scale.
All cathode values on R X 10 scale.

e. Oscillator Panel PN-9-A

Tune up the transmitter. Keep the OUTPUT VOLTAGE meter on Power Control Panel PN-13-A constant at 230 volts a.c. (red line). The following voltages were measured from tube-socket terminals to chassis.

Tube	*Function*	*Socket*	*Filament Voltage (a-c)*	*Plate Voltage (d-c)*	*Screen Voltage (d-c)*	*Cathode Current (ma)*	*Grid Current*
VT-175	C0	197	6.3	315	150	10–15	—
VT-100	T1	198	6.3	395	150	30–40	—
VT-204	T2	199-1	6.3	395	—	45–60	—
VT-204	D	199-2	6.3	395	—	54–65	—
VT-204	IPA	199-3	6.3	800	—	50–70	8–15 ma

(1) The following resistances in ohms were measured from the tube socket to ground with power turned off and the oscillator panel removed from the rack.

Tube	*Function*	*Socket*	*Filament*	*Plate*	*Grid*	*Screen*	*Cathode*
VT-175	C0	197	—	Inf.	100,000	Inf.	50†
VT-100	T1	198	—	Inf.	25,000	Inf.	1000*
VT-204	T2	199-1	1000*	Inf.	25,000	—	—
VT-204	D	199-2	50†	Inf.	15,000	—	—
VT-204	IPA	199-3	175†	Inf.	10,000	—	—

NOTE: All grid values on R X 1000 scale.
* R X 100 scale.
† R X 10 scale.
Meter selector switch should not be in circuit measured.

f. Amplifier Panel PN-8-A

Keep OUTPUT VOLTAGE meter on power control panel constant at 230 volts a.c. (red line). Transmitter unmodulated, with proper load connected to antenna terminals (60w lamp, 120v).

Tube	*Function*	*Socket*	*Heater Voltage (a-c)*	*Plate Voltage (d-c)*	*Cathode Current (ma)*	*Grid Current (ma)*	*Plate Current*
VT-204	PA	147-1	6.3	800	C1, 70–78	G1, 10–18	—
VT-204	PA	147-2	6.3	800	C2, 70–78	G2, 10–18	—
VT-94	MON	148	6.3	—	—	—	1.6 ma

Meter selector switch should not be in circuit measured.

The following resistances were measured in ohms from the tube-socket terminals to groun[illegible]ith power turned off and amplifier panel removed from rack.

Tube	*Function*	*Socket*	*Heater*	*Plate*	*Grid*
VT-204	PA	147-1	50	Inf.	—
VT-204	PA	147-2	50	Inf.	—
VT-94	MON	148	—	50	50

NOTE

AS A RESULT OF SHORTAGES OF CRITICAL MATERIALS, IT MAY BE NECESSARY FOR THE CONTRACTOR TO SUBSTITUTE LESS CRITICAL MATERIALS IN SOME INSTANCES. THE DATA SUPPLIED IN THIS BOOK REGARDING ELECTRICAL PARTS IS CORRECT AS OF THE DATE OF PUBLICATION.

TO ASSURE THAT ADEQUATE REPLACEMENT PARTS ARE OBTAINED, IT IS IMPERATIVE THAT REPLACEMENT PARTS BE ORDERED NOT ONLY BY THE CONTRACTOR'S DRAWING NUMBER AS IT APPEARS IN THE INSTRUCTION BOOK BUT ALSO BY THE REFERENCE NUMBER ASSIGNED TO A PARTICULAR PART.

15. TABLE OF REPLACEABLE PARTS

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers*	
						Bendix	*Sig. Corp.*
a. Control Panel PN-11-A							
1-1	3DB20-4	Capacitor	20 mfd, 50v dcw, Type EM50	(Mic.) filter	Aero	A104504	
1-2	.	Capacitor	Same as 1-1	(Mic.) filter	.	.	
1-3	.	Capacitor	Same as 1-1	Plate filter	.	.	
1-4	.	Capacitor	Same as 1-1	Plate filter	.	.	
2-1	.	Fuse	250v, 5 amp.	A-C input	Bussman	A104542-1	
2-2	.	Fuse	Same as 2-1	A-C input	.	.	
3-1	.	Fuse	250v, 3 amp.	High voltage supply	Bussman	A104542-2	
3-2	.	Fuse	Same as 3-1	High voltage supply	.	.	
4-1	.	Fuse	250v, [illegible]2 amp.	Filament supply	Bussman	A104542-3	
4-2	.	Fuse	Same as 4-1	Filament supply	.	.	
5-1	2Z5597	Jack	Lamp socket, Cat. No. 13	R-F filament on indicator	Stromberg Carlson	A104502	
5-2	.	Jack	Same as 5-1	A-F filament on indicator	.	.	
5-3	.	Jack	Same as 5-1	R-F high voltage on indicator	.	.	
5-4	.	Jack	Same as 5-1	A-F high voltage on indicator	.	.	
6	2Z7646.1	Relay	230v, 50/60 cycles a-c, No. CR2810-1820 A66	Plate contactor	General Electric	C58343	
7	3H5011	Relay	Single wound, 200Ω d-c resistance, Type 504-2-1 d-c	"Transmitter Available" Light control	Stromberg Carlson	C58363	
8	3H5011	Relay	Single wound, 200Ω d-c resistance, Type 505-559-1 d-c	Plate control	Stromberg Carlson	C58363	
9	3C1081A	Reactor	15h, .080a d-c, 100Ω d-c resistance, 2500v rms, 60 cycle test, XR-718	Filter choke	Bendix	A103032	

APPENDIX

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
10-1	4C5404	Lamp	4v, .210 amps. switchboard, Cat. No. 4-A-2	R-F filament on	Stromberg Carlson	A104501	
10-2	.	Lamp	Same as 10-1	A-F filament on	.	.	
10-3	.	Lamp	Same as 10-1	R-F high voltage on	.	.	
10-4	.	Lamp	Same as 10-1	A-F high voltage on	.	.	
11	3Z6012-3	Resistor	120Ω, 30w, Type 1-1/4″ BR	Relay current supply bleeder	H.H.	A104505	
12	3H4856-2	Rectifier	Full wave bridge type, 24v d-c, .46 amp., with 25 mfd condenser input filter, Code No. 11B2AM1	Relay current supply	Int. Tel.	A106056	
13-1	3Z9824-270	Switch	Push button, DPST, 250v, 10 amp., Cat. No. 68248	Master filament	General Electric	A104508	
13-2	.	Switch	Same as 13-1	Master high voltage	.	.	
14	3Z9862	Switch	SPDT tumbler switch 250v, 5 amp., Cat. No. GE2514	Tune-operate	General Electric	A104509	
15-1	3Z9861-1	Switch	DPST, flush tumbler, 250v, 10 amp., Cat. No. 1312	R-F filament	Pass & Seymour	A104507	
15-2	.	Switch	Same as 15-1	A-F filament	.	.	
15-3	.	Switch	Same as 15-1	R-F high voltage	.	.	
15-4	.	Switch	Same as 15-1	A-F high voltage	.	.	
16	2Z9937-4	Transformer	230v, 50-60 cycles, 15.5 va, 1500v, rms	Relay current supply	Bendix	A103002	
	4C2431C	Lamp cap	Green glass, Cat. No. 31-C	Filament on indicator	Stromberg Carlson	A104503-2	
	4C2431B	Lamp cap	Red glass, Cat. No. 31-B	High voltage on indicator	Stromberg Carlson	A104503-1	

b. Modulator Panel PN-10-A

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Drawing Numbers Sig. Corp.
31-1	3D9500-67	Capacitor	.0005 mfd ±10%, 1000v dct, mica, Type 1468	Microphone jack r-f bypass	Aero. C.D. Micamold	A104591-2	
31-2	.	Capacitor	Same as 31-1	.	.	.	
31-3	.	Capacitor	Same as 31-1	.	.	.	

Ref. No.	Stock No.	Name	Description	Function	Mfr.	Drawing Numbers Bendix	Sig. Corp.
31-4	.	Capacitor	Same as 31-1	.	.	.	
31-5	.	Capacitor	Same as 31-1	Control circuit r-f bypass	.	.	
31-6	.	Capacitor	Same as 31-1	.	.	.	
31-7	.	Capacitor	Same as 31-1	Audio input r-f bypass	.	.	
31-8	.	Capacitor	Same as 31-1	.	.	.	
31-9	.	Capacitor	Same as 31-1	MCW control r-f bypass	.	.	
31-10	.	Capacitor	Same as 31-1	First audio filament bypass	.	.	
31-11	.	Capacitor	Same as 31-1	.	.	.	
31-12	.	Capacitor	Same as 31-1	.	.	.	
31-13	.	Capacitor	Same as 31-1	.	.	.	
31-14	.	Capacitor	Same as 31-1	First audio cathode bypass	.	.	
31-15	.	Capacitor	Same as 31-1	.	.	.	
31-16	.	Capacitor	Same as 31-1	Driver filament bypass	.	.	
31-17	.	Capacitor	Same as 31-1	.	.	.	
31-18	.	Capacitor	Same as 31-1	.	.	.	
31-19	.	Capacitor	Same as 31-1	.	.	.	
31-20	.	Capacitor	Same as 31-1	Modulator filament bypass	.	.	
31-21	.	Capacitor	Same as 31-1	.	.	.	
31-22	.	Capacitor	Same as 31-1	.	.	.	
31-23	.	Capacitor	Same as 31-1	.	.	.	
31-24	.	Capacitor	Same as 31-1	Input r-f bypass	.	.	
31-25	.	Capacitor	Same as 31-1	.	.	.	
31-26	.	Capacitor	Same as 31-1	.	.	.	
31-27	.	Capacitor	Same as 31-1	.	.	.	

APPENDIX

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers*	
						Bendix	*Sig. Corp.*
31-28	•	Capacitor	Same as 31-1	•	•	•	
31-29	•	Capacitor	Same as 31-1	•	•	•	
32-1	3D9100-67	Capacitor	.0001 mfd ±10%, 1000v dct, mica, Type 1468	First audio grid filter	Aero.	A104591-1	
32-2	•	Capacitor	Same as 32-1	•	•	•	
33-1	3DAZ-77	Capacitor	.002 mfd +14% —6%, 500v dct, mica, Aerovox Type 1467, Cornell Dubilier Type 1WL	First audio grid filter	Aero., C.D.	A104614-1	
33-2	•	Capacitor	Same as 33-1	•	•	•	
34	3DA20-37	Capacitor	.02 mfd ±10%, 1000v dct, mica, Type 1650	Audio oscillator grid blocking	Aero.	A104195-1	
35	3DA4.500	Capacitor	.0045 mfd ±2%, 1000v dct, mica, Type 1650, high stability—low temperature coefficient	Audio oscillator tuning	Aero.	A104195-3	
36-1	3DB25-13	Capacitor	25 mfd +25%—5%, 25v dcw, electrolytic	Relay filter	Aero.	A104198-1	
36-2	•	Capacitor	Same as 36-1	•	•	•	
37	3DB2.6020-2	Capacitor	2.0 mfd, 600v dcw, Type TJL6020	Input blocking	C.D.	C58338-3	
38-1	3DB4-40	Capacitor	4.0 mfd, 600v dcw, Type TJL6040	First audio plate bypass	C.D.	C58338-4	
38-2	•	Capacitor	Same as 38-1	Driver plate bypass	•	•	
39	3D157	Capacitor	.02 mfd +14% —6%, 1000v dct, mica, Type CA-157	Meter bypass	C.D.	A104604	
40	2Z-5522.1	Jack	2-conductor contacts, Type 239A	Microphone jack	Stromberg Carlson	A104574-1	
41	2Z-5522.2	Jack	2-conductor contacts, Type 239A	Microphone jack	Stromberg Carlson	A104574-2	
42	2Z7675-2	Relay	Quick acting relay, 100Ω d-c resistance, 4 to 6v d-c operation, contacts ay-ay spring combination, Type 504-5-1	Keying relay	Stromberg Carlson	C58361	

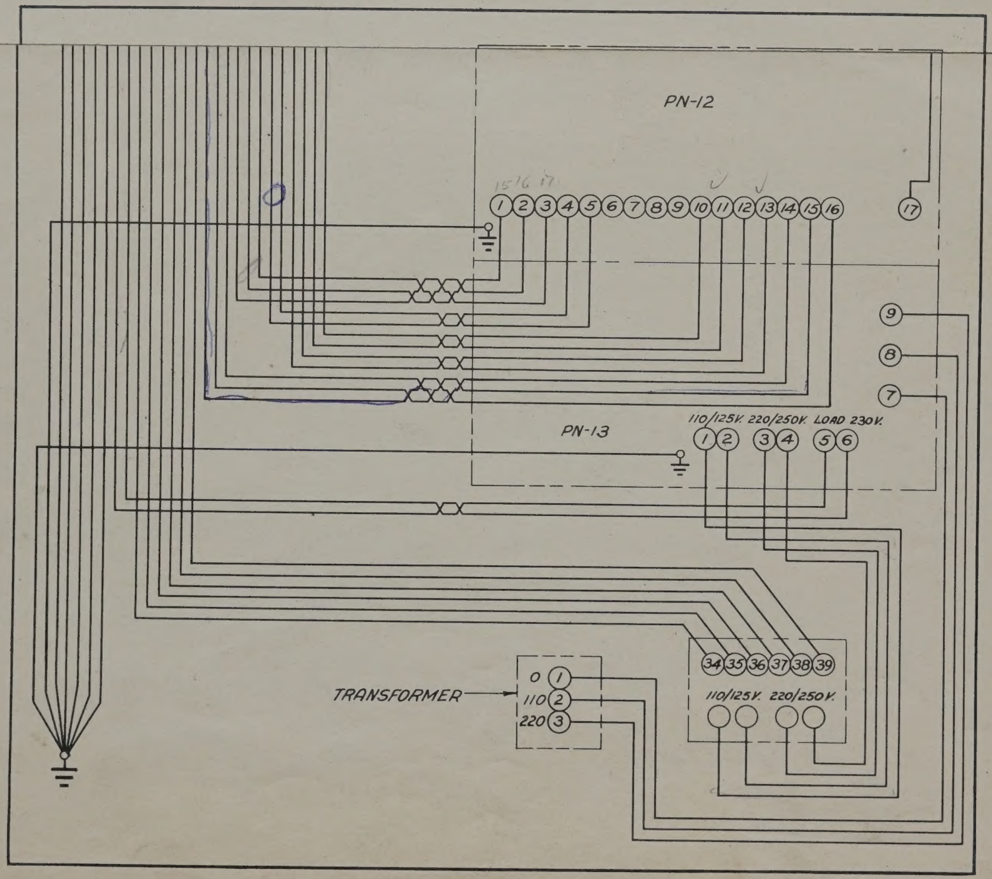

PN-12
15 16 17
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
9
8
7
PN-13
110/125V. 220/250V. LOAD 230V.
1
2
3
4
5
6
34
35
36
37
38
39
110/125V. 220/250V.
TRANSFORMER
0
1
110
2
220
3

FIGURE 28—RADIO TRANSMITTER BC-640-A, INTERPANEL WIRING DIAGRAM

Ref. No.	*Stock No.*	*Name*	*Description*	*Function*	*Mfr.*	*Drawing Numbers*	
						Bendix	*Sig. Corp.*
31-28	•	Capacitor	Same as 31-1	•	•	•	
31-29	•	Capacitor	Same as 31-1	•	•	•	
32-1	3D9100-67	Capacitor	.0001 mfd ±10%, 1000v dct, mica, Type 1468	First audio grid filter	Aero.	A104591-1	
32-2	•	Capacitor	Same as 32-1	•	•	•	
33-1	3DAZ-77	Capacitor	.002 mfd +14% —6%, 500v dct, mica, Aerovox Type 1467, Cornell Dubilier Type 1WL	First audio grid filter	Aero., C.D.	A104614-1	
33-2	•	Capacitor	Same as 33-1	•	•	•	
34	3DA20-37	Capacitor	.02 mfd ±10%, 1000v dct, mica, Type 1650	Audio oscillator grid blocking	Aero.	A104195-1	
35	3DA4.500	Capacitor	.0045 mfd ±2%, 1000v dct, mica, Type 1650, high stability—low temperature coefficient	Audio oscillator tuning	Aero.	A104195-3	
36-1	3DB25-13	Capacitor	25 mfd +25%—5%, 25v dcw, electrolytic	Relay filter	Aero.	A104198-1	
36-2	•	Capacitor	Same as 36-1	•	•	•	
37	3DB2.6020-2	Capacitor	2.0 mfd, 600v dcw, Type TJL6020	Input blocking	C.D.	C58338-3	
38-1	3DB4-40	Capacitor	4.0 mfd, 600v dcw, Type TJL6040	First audio plate bypass	C.D.	C58338-4	
38-2	•	Capacitor	Same as 38-1	Driver plate bypass	•	•	
39	3D157	Capacitor	.02 mfd +14% —6%, 1000v dct, mica, Type CA-157	Meter bypass	C.D.	A104604	
40	2Z-5522.1	Jack	2-conductor contacts, Type 239A	Microphone jack	Stromberg Carlson	A104574-1	
41	2Z-5522.2	Jack	2-conductor contacts, Type 239A	Microphone jack	Stromberg Carlson	A104574-2	
42	2Z7675-2	Relay	Quick acting relay, 100Ω d-c resistance, 4 to 6v d-c operation, contacts ay-ay spring combination, Type 504-5-1	Keying relay	Stromberg Carlson	C58361	

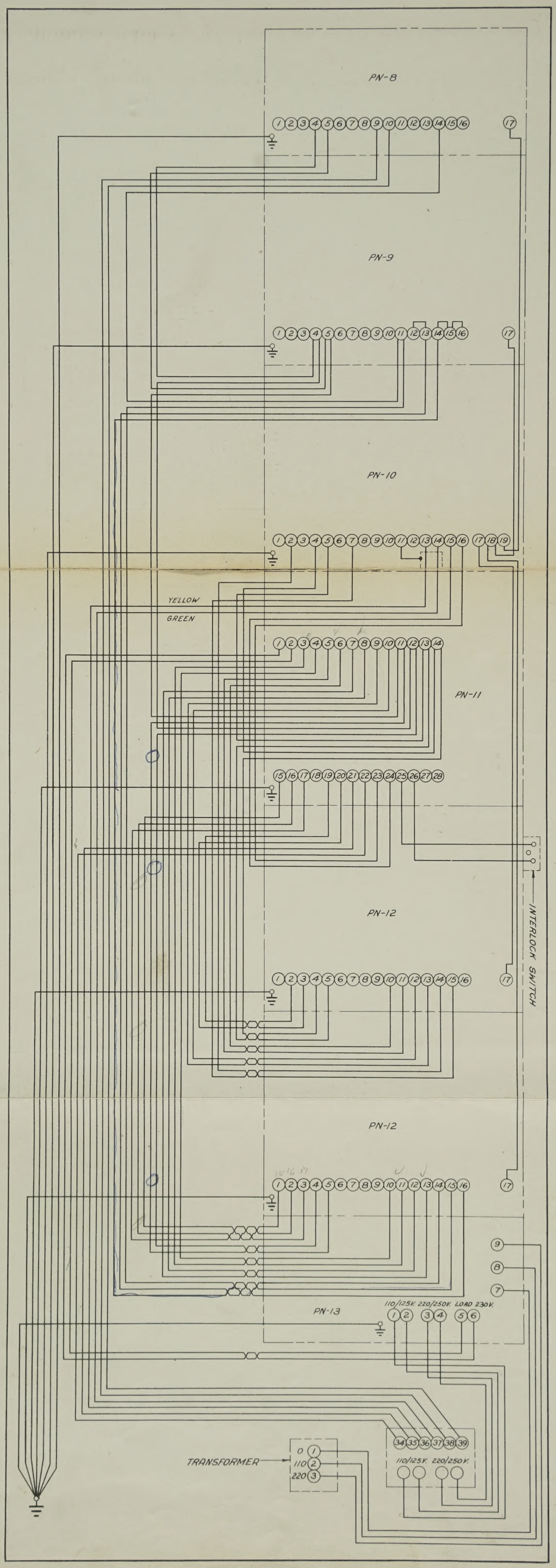
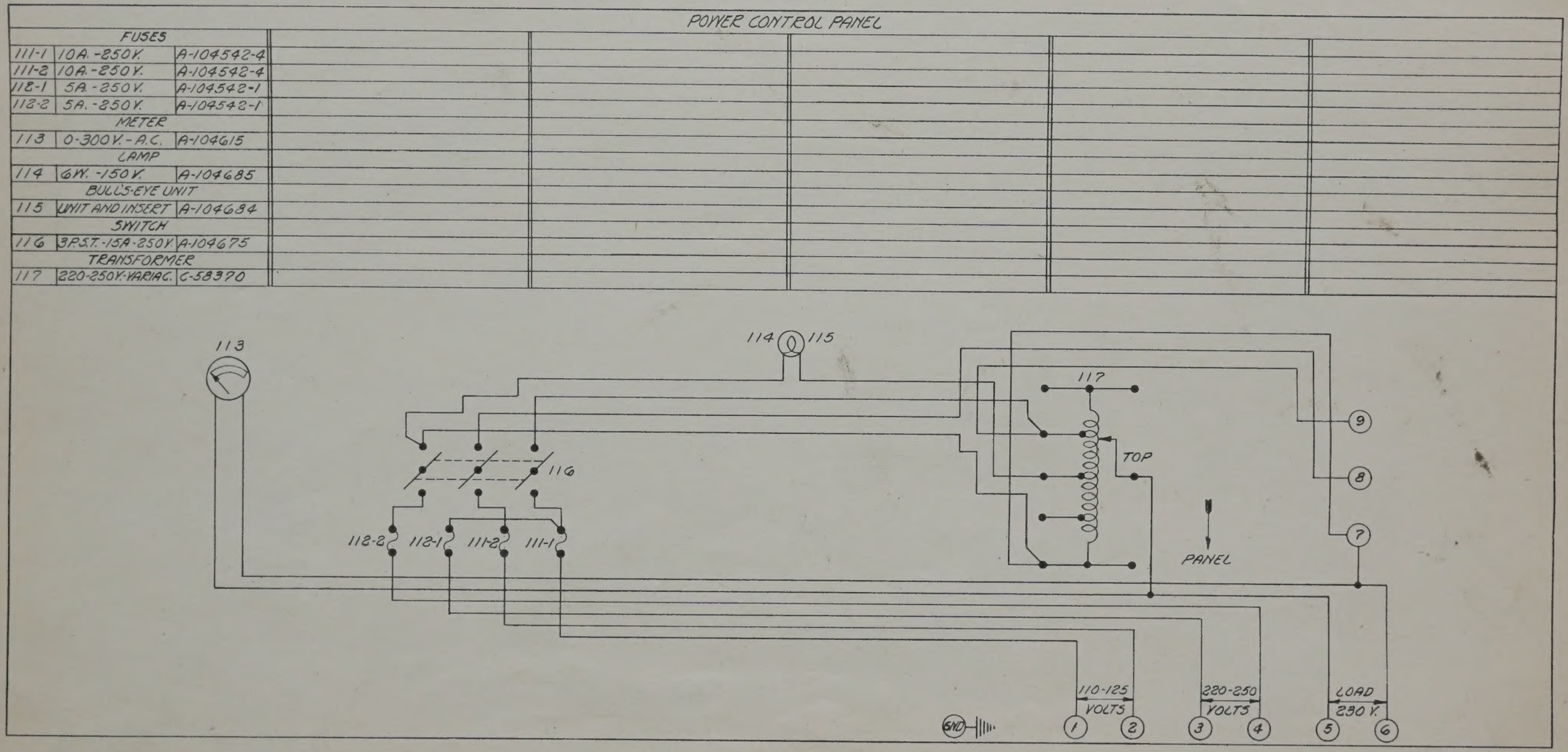

PN-8
PN-9
PN-10
YELLOW
GREEN
PN-11
PN-12
INTERLOCK SWITCH
PN-12
PN-13
110/125V. 220/250V. LOAD 230V.
TRANSFORMER
0
110
220
110/125V. 220/250V.

Figure 28—Radio Transmitter BC-640-A, Interpanel Wiring Diagram



POWER CONTROL PANEL
113
114
115
116
117
TOP
PANEL
9
8
7
112-2
112-1
111-2
111-1
110-125 VOLTS
220-250 VOLTS
LOAD 230 V.
GND
1
2
3
4
5
6

FUSES		
111-1	10A. -250V.	A-104542-4
111-2	10A. -250V.	A-104542-4
112-1	5A. -250V.	A-104542-1
112-2	5A. -250V.	A-104542-1
METER		
113	0-300V. - A.C.	A-104615
LAMP		
114	6W. -150V.	A-104685
BULL'S-EYE UNIT		
115	UNIT AND INSERT	A-104684
SWITCH		
116	3P.S.T. -15A -250V.	A-104675
TRANSFORMER		
117	220-250V.-VARIAC.	C-58370

FIGURE 29—POWER CONTROL PANEL PN-13-A, SCHEMATIC DIAGRAM

POWER SUPPLY PANEL					
CAPACITORS			98	PLATE	A-103004
91	10MFD.-1500V.	C-58338-6	SOCKETS		
92	10MFD-600V.	C-58338-5	99-1	4 PRONG	A-30440
93-1	.1MFD.-600V.	A-104625-1	99-2	4 PRONG	A-30440
93-2	.1MFD.-600V.	A-104625-1	99-3	4 PRONG	A-30440
CHOKES			99-4	4 PRONG	A-30440
94-1	11HENRIES-.27A.	A-27094	TUBES		
94-2	11HENRIES-.27A.	A-27094	VT-145	RECTIFIER	523
RESISTORS					
95-1	8000^{w}-90W.	A-104573-5			
95-2	8000^{w}-90W.	A-104573-5			
96	1500^{w}-40W.	A-104573-3			
TRANSFORMERS					
97	FILAMENT	A-27090			

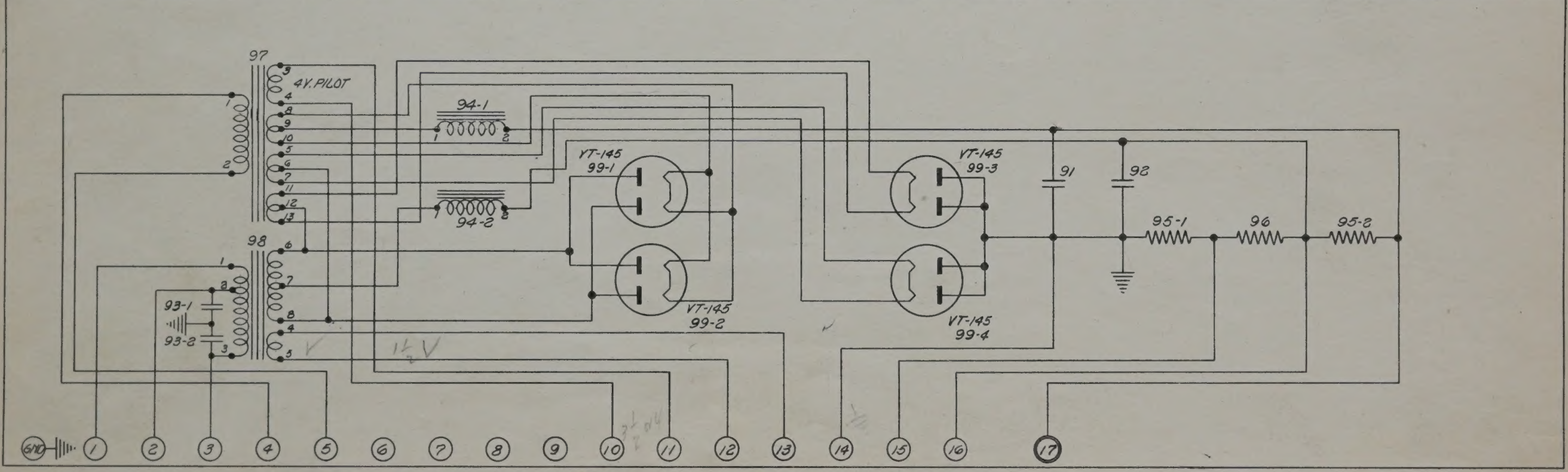

97
4V. PILOT
94-1
94-2
98
93-1
93-2
VT-145 99-1
VT-145 99-2
VT-145 99-3
VT-145 99-4
91
92
95-1
96
95-2
1½V
GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

FIGURE 30—POWER SUPPLY PANEL PN-12-A, SCHEMATIC DIAGRAM

CONTROL PANEL

CAPACITORS		
1-1	20 MFD. - 50 V.	A-104504
1-2	20 MFD. - 50 V.	A-104504
1-3	20 MFD. - 50 V.	A-104504
1-4	20 MFD. - 50 V.	A-104504
FUSES		
2-1	5 AMP. - 250 V.	A-104542-1
2-2	5 AMP. - 250 V.	A-104542-1
3-1	3 AMP. - 250 V.	A-104542-2
3-2	3 AMP. - 250 V.	A-104542-2

4-1	2 AMP. - 250 V.	A-104542-3
4-2	2 AMP. - 250 V.	A-104542-3
JACKS		
5-1	LAMP	A-104502
5-2	LAMP	A-104502
5-3	LAMP	A-104502
5-4	LAMP	A-104502
RELAYS		
6	PLATE CONTACTOR	C-58343
7	SIGNAL CONTROL	C-58363

8	PLATE CONTROL	C-58363
CHOKE COIL		
9	15 HENRIES-.08A.	A-103032
LAMPS		
10-1	PILOT - 4 V.	A-104501
10-2	PILOT - 4 V.	A-104501
10-3	PILOT - 4 V.	A-104501
10-4	PILOT - 4 V.	A-104501
RESISTOR		
11	120ω - 30 W.	A-104505

RECTIFIER		
12	24 V. - .46 A. DC.	A-106056
SWITCHES		
13-1	MASTER FIL.	A-104508
13-2	MASTER H.V.	A-104508
14	TUNE - OPERATE	A-104509
15-1	R.F. FIL.	A-104507
15-2	A.F. FIL.	A-104507
15-3	R.F. FIL.	A-104507
15-4	A.F. FIL.	A-104507

TRANSFORMER		
16	RECTIFIER	A-103002
LAMP CAPS		
	GREEN	A-104503-C
	RED	A-104503-B

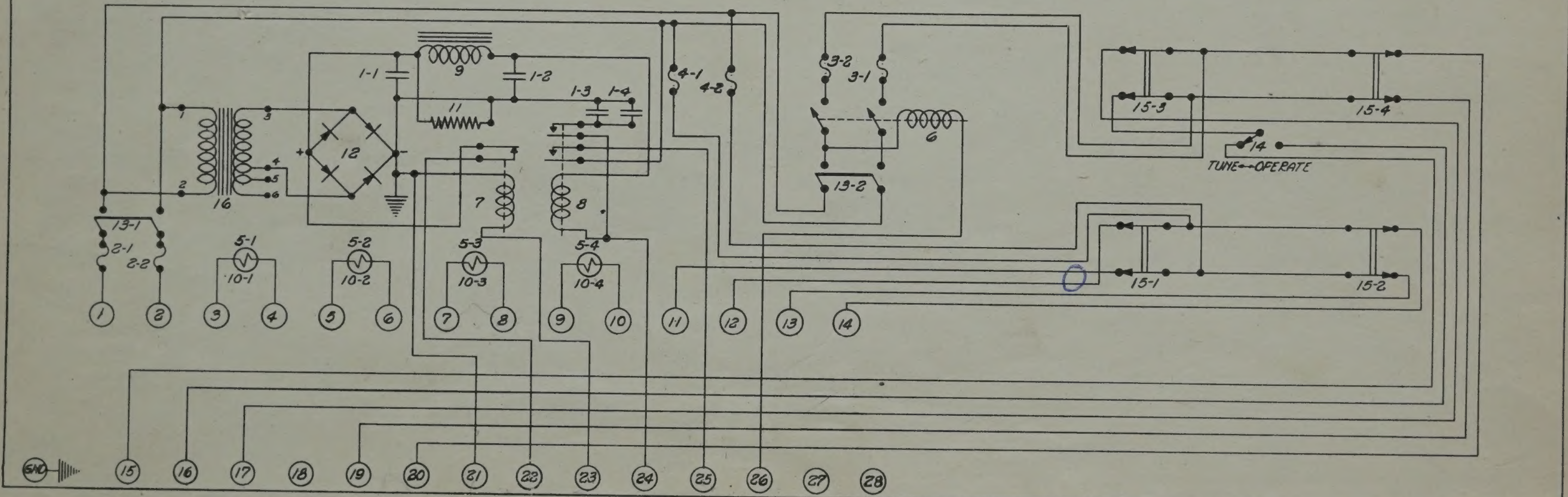

1-1
9
1-2
11
1-3
1-4
4-1
4-2
3-2
3-1
6
12
16
7
8
13-1
2-1
2-2
13-2
15-3
15-4
14
TUNE↔OPERATE
15-1
15-2
5-1
10-1
5-2
10-2
5-3
10-3
5-4
10-4
1
2
3
4
5
6
7
8
9
10
11
12
13
14
GND
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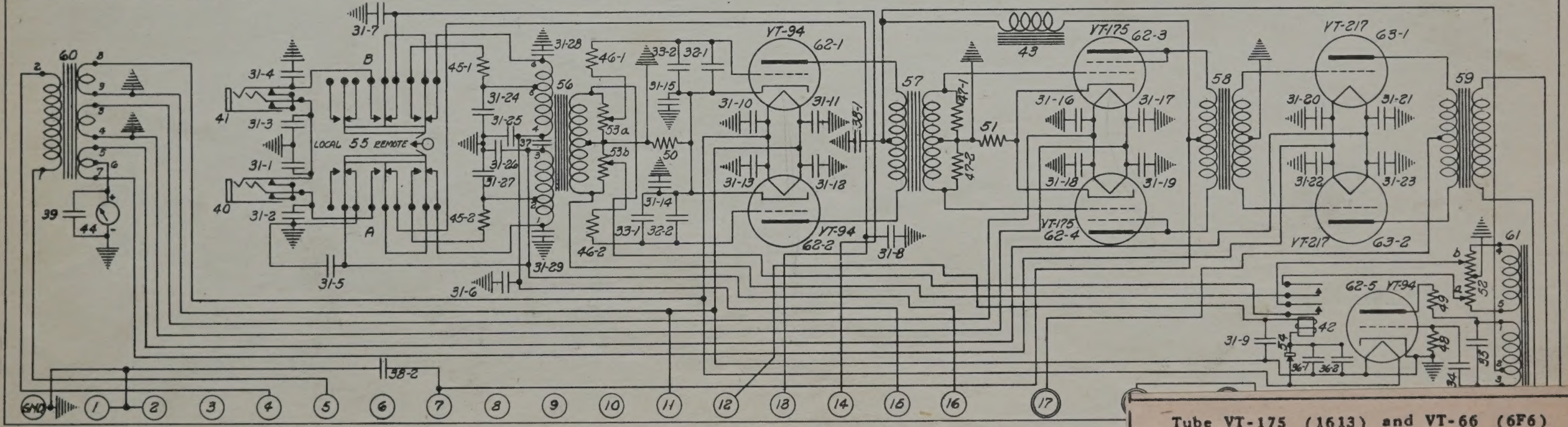
Figure 31—Control Panel PN-11-A, Schematic Diagram

MODULATOR PANEL

CAPACITORS			31-16	.0005MFD.-1000V.	A-104591-2	32-2	.0001MFD-1000V.	A-104591-1	CHOKE COIL			53	15,000ω-DUAL V.C.	A-104577-1	62-4	OCTAL	A-18168-6
31-1	.0005MFD.-1000V.	A-104591-2	31-17	.0005MFD.-1000V.	A-104591-2	33-1	.002 MFD.-500V.	A-104614-1	43	30HENRIES-.025A.	A-27098	RECTIFIER			62-5	OCTAL	A-18168-6
31-2	.0005MFD.-1000V.	A-104591-2	31-18	.0005MFD.-1000V.	A-104591-2	33-2	.002MFD.-500V.	A-1046141	METER			54	5V.-.05A. D.C.	A-104500	63-1	4 PRONG	A-18168-1
31-3	.0005MFD.-1000V.	A-104591-2	31-19	.0005MFD.-1000V.	A-104591-2	34	.02 MFD.-1000V.	A-104195-1	44	0-200 MA.	A-104194-3	KEY			63-2	4 PRONG	A-18168-1
31-4	.0005MFD.-1000V.	A-104591-2	31-20	.0005MFD.-1000V.	A-104591-2	35	.0045MFD-1000V.	A-104195-3	RESISTORS			55	LEVER	A-104575	TUBES		
31-5	.0005MFD.-1000V.	A-104591-2	31-21	.0005MFD.-1000V.	A-104591-2	36-1	25 MFD.-25V.	A-104198-1	45-1	200ω - 1/2 W.	A-104572-201	TRANSFORMERS			VT-94	AUDIO OSC.	6J5
31-6	.0005MFD.-1000V.	A-104591-2	31-22	.0005MFD.-1000V.	A-104591-2	36-2	25 MFD.-25V.	A-104198-1	45-2	200ω - 1/2 W.	A-104572-201	56	MICROPHONE	A-103006	VT-175	DRIVER	1613
31-7	.0005MFD.-1000V.	A-104591-2	31-23	.0005MFD.-1000V.	A-104591-2	37	2 MFD.-600V.	C-58338-3	46-1	10,000ω-1/2 W.	A-104572-103	57	INTERSTAGE	A-103008	VT-217	MODULATOR	811
31-8	.0005MFD.-1000V.	A-104591-2	31-24	.0005MFD.-1000V.	A-104591-2	38-1	4 MFD.-600V.	C-58338-4	46-2	10,000ω-1/2 W.	A-104572-103	58	DRIVER	A-103010	VT-94	1 ST. AUDIO AMP.	6J5
31-9	.0005MFD.-1000V.	A-104591-2	31-25	.0005MFD.-1000V.	A-104591-2	38-2	4 MFD.-600V.	C-58338-4	47-1	50,000ω-1/2 W.	A-104572-503	59	MODULATION	A-103000			
31-10	.0005MFD.-1000V.	A-104591-2	31-26	.0005MFD.-1000V.	A-104591-2	39	.02MFD.-600V.	A-104604	47-2	50,000ω-1/2 W.	A-104572-503	60	FILAMENT	A-27086			
31-11	.0005MFD.-1000V.	A-104591-2	31-27	.0005MFD.-1000V.	A-104591-2	JACKS			48	1 MEGOHM-1/2 W.	A-104572-105	61	AUDIO	A-27096			
31-12	.0005MFD.-1000V.	A-104591-2	31-28	.0005MFD.-1000V.	A-104591-2	40	MICROPHONE	A-104574-1	49	50,000ω-2 W.	A-105162-503	SOCKETS.					
31-13	.0005MFD.-1000V.	A-104591-2	31-29	.0005MFD.-1000V.	A-104591-2	41	MICROPHONE	A-104574-2	50	500ω-2 W.	A-105162-501	62-1	OCTAL	A-18168-6			
31-14	.0005MFD.-1000V	A-104591-2				RELAY			51	325ω-25 W.	A-104573-2	62-2	OCTAL	A-18168-6			
31-15	.0005MFD.-1000V.	A-104591-2	32-1	.0001MFD.-1000V.	A-104591-1	42	KEYING	C-58361	52	600ω-DUAL V.C.	A-104577-2	62-3	OCTAL	A-18168-6			


60
39
44
41
40
31-1
31-2
31-3
31-4
31-5
31-6
31-7
B
A
LOCAL 55 REMOTE
45-1
45-2
31-24
31-25
31-26
31-27
37
31-28
31-29
56
53a
53b
46-1
46-2
33-2
32-1
31-15
50
31-14
33-1
32-2
VT-94
62-1
31-10
31-11
38-1
31-13
31-18
VT-94
62-2
31-8
57
47-1
47-2
51
43
VT-175
62-3
31-16
31-17
31-18
31-19
VT-175
62-4
58
VT-217
63-1
31-20
31-21
31-22
31-23
VT-217
63-2
59
61
52
62-5
VT-94
49
48
42
31-9
54
36-1
36-2
35
34
38-2
GND
1
2
3
4
5
6
7
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12
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FIGURE 32—MODULATOR PANEL PN-10-A, SCHEMATIC DIAGRAM

Tube VT-175 (1613) and VT-66 (6F6) are practically alike and are interchangeable in this equipment without affecting performance.

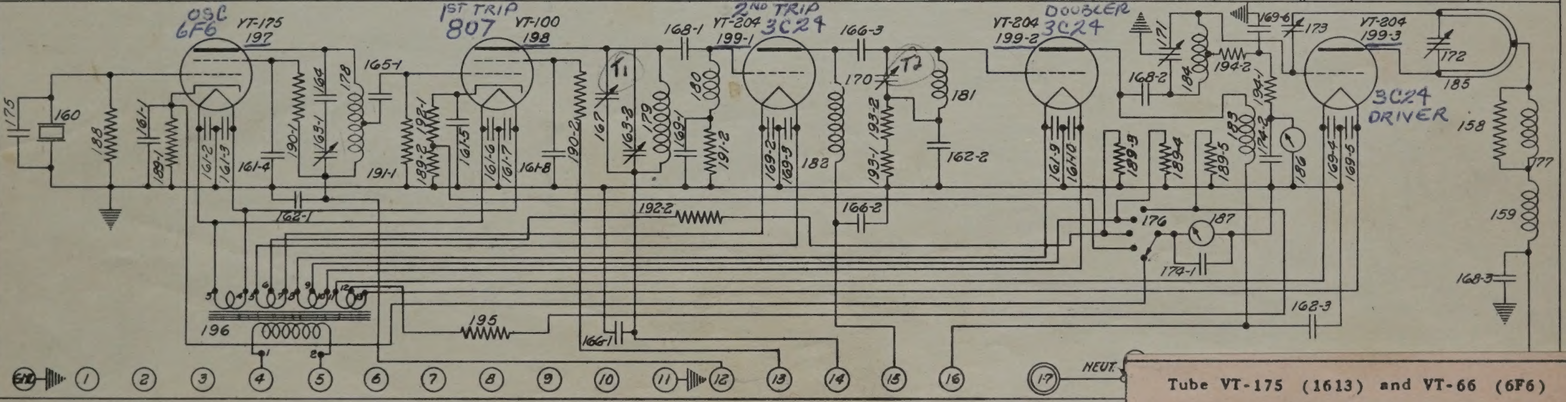
D-12274

RC-1 ← 48V CONTROL

5A+B ←

OSCILLATOR PANEL

CAPACITORS			166-1	.002MFD.-2500V.	A-104195-7	174-2	.02MFD.-600V.	A-104604	189-3	50ω-2W.	A-105162-50	SWITCH			VT-204	I.P.A.	HK-24-G
161-1	.005MFD.-600V.	A-104614-2	166-2	.002MFD.-2500V.	A-104195-7	175	15MMFD.-500V.	A-18182-17	189-4	50ω-2W.	A-105162-50	176	METER	A-105946			
161-2	.005MFD.-600V.	A-104614-2	166-3	.002MFD.-2500V.	A-104195-7	INDUCTANCES			189-5	50ω-2W.	A-105162-50	TRANSFORMER					
161-3	.005MFD.-600V.	A-104614-2	167	TRIMMER	A-105262	159	CHOKE	AA-105376-2	190-1	50,000ω-2W.	A-105162-503	196	FILAMENT	A-27092			
161-4	.005MFD.-600V.	A-104614-2	168-1	.0005MFD.-5000V.	A-104195-6	177	CHOKE	A-105375-1	190-2	50,000ω-2W.	A-105162-503	SOCKETS					
161-5	.005MFD.-600V.	A-104614-2	168-2	.0005MFD.-5000V.	A-104195-6	178	TANK	AA-105373-1	191-1	25,000ω-2W.	A-105162-253	160	CRYSTAL	AC-58396-1			
161-6	.005MFD.-600V.	A-104614-2	168-3	.0005MFD.-5000V.	A-104195-6	179	TANK	AA-105374-1	191-2	25,000ω-2W.	A-105162-253	197	OCTAL	A-18168-6			
161-7	.005MFD.-600V.	A-104614-2	169-1	.002MFD.-500V.	A-104614-1	180	CHOKE	AA-105376-1	192-1	1000ω-15W.	A-104573-6	198	5CONTACT	A-18168-2			
161-8	.005MFD.-600V.	A-104614-2	169-2	.002MFD.-500V.	A-104614-1	181	TANK	AA-105372-1	192-2	1000ω-15W.	A-104573-6	199-1	4CONTACT	A-18168-1			
161-9	.005MFD.-600V.	A-104614-2	169-3	.002MFD.-500V.	A-104614-1	182	CHOKE	AA-105377-1	193-1	7500ω-2W.	A-105162-752	199-2	4CONTACT	A-18168-1			
161-10	.005MFD.-600V.	A-104614-2	169-4	.002MFD.-500V.	A-104614-1	183	CHOKE	AA-105378-1	193-2	7500ω-2W.	A-105162-752	199-3	4CONTACT	A-18168-1			
162-1	.005MFD.-1000V.	A-104195-5	169-5	.002MFD.-500V.	A-104614-1	184	TANK	A-103752	194-1	5000ω-2W.	A-105162-502	CRYSTAL					
162-2	.005MFD.-1000V.	A-104195-5	169-6	.002MFD.-500V.	A-104614-1	185	TANK	A-105261	194-2	5000ω-2W.	A-105162-502		CRYSTAL	AC-58203			
162-3	.005MFD.-1000V.	A-104195-5	170	TUNING	A-105239	RESISTORS			195	125ω-15W.	A-104573-1	TUBES					
163-1	TUNING	A-105240-1	171	TUNING	A-105623	158	500ω-2W.	A-105162-501	METERS			VT-175	OSC.	1613			
163-2	TUNING	A-105240-1	172	TUNING	A-105241	188	100,000ω-2W.	A-105162-104	186	0-25MA.	A-104194-1	VT-100	1ST. TRIP.	807			
164	.002MFD.-1000V.	A-104195-8	173	NEUTRALIZING	A-105624	189-1	50ω-2W.	A-105162-50	187	0-100MA.	A-104194-2	VT-204	2ND. TRIP.	HK-24-G			
165	50MMFD.-1000V.	A-104195-4	174-1	.02MFD.-600V.	A-104604	189-2	50ω-2W.	A-105162-50				VT-204	DOUBLER	HK-24-G			


OSC 6F6
VT-175
197
1ST TRIP 807
VT-100
198
2ND TRIP 3C24
VT-204
199-1
DOUBLER 3C24
VT-204
199-2
VT-204
199-3
3C24 DRIVER
T1
T2
175
160
188
189-1
161-1
161-2
161-3
161-4
190-1
163-1
164
178
165-1
162-1
191-1
189-2
192-1
161-5
161-6
161-7
161-8
190-2
167
163-2
179
169-1
168-1
180
191-2
169-2
169-3
182
166-3
170
193-1
193-2
181
162-2
166-2
192-2
161-9
161-10
168-2
171
184
194-2
169-6
173
194-1
189-3
189-4
189-5
183
174-2
186
176
187
174-1
169-4
169-5
172
185
158
177
159
168-3
162-3
166-1
195
196
NEUT.
1
2
3
4
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12
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16
17

FIGURE 33—OSCILLATOR PANEL PN-9-A, SCHEMATIC DIAGRAM

Tube VT-175 (1613) and VT-66 (6F6) are practically alike and are interchangeable in this equipment without affecting performance.

D-12274

POWER AMPLIFIER PANEL

CAPACITORS			128	TUNING	A-105268				145-2	3000 ω.-2 W.	A-105162-302
121-1	.005 MFD.-600 V.	A-104614-2	129	TUNING	AA-105248-1 A-104173	METERS			TRANSFORMER		
121-2	.005 MFD.-600 V.	A-104614-2	130	TUNING	A-105331	139	0-25 MA.	A-104194-1	146	FILAMENT	A-27088
121-3	.005 MFD.-600 V.	A-104614-2	131	NEUTRALIZING	A-105269	140	0-100 MA.	A-104194-2	SOCKETS		
121-4	.005 MFD.-600 V.	A-104614-2	132-1	.02 MFD.-1000 V.	A-104604	RESISTORS			147-1	4 CONTACT	A-18168-1
122-1	.0001 MFD.-1000 V.	A-104591-1	132-2	.02 MFD.-1000 V.	A-104604	141-1	500 ω.-2 W.	A-105162-501	147-2	4 CONTACT	A-18168-1
122-2	.0001 MFD.-1000 V.	A-104591-1	JACK			141-2	500 ω.-2 W.	A-105162-501	148	OCTAL	A-18168-6
122-3	.0001 MFD.-1000 V.	A-104591-1	133	MON. JACK	A-104574-2	142	5000 ω.-2 W.	A-105162-508	SWITCHES		
122-4	.0001 MFD.-1000 V.	A-104591-1	INDUCTANCES			143-1	50 ω.-2 W.	A-105162-50	149	GRID METER	A-105371
122-5	.0001 MFD.-1000 V.	A-104591-1	134-1	PLATE CHOKE	A-105375-1	143-2	50 ω.-2 W.	A-105162-50	150	CATHODE METER	A-105370
122-6	.0001 MFD.-1000 V.	A-104591-1	134-2	MON. FILTER	A-105375-1	143-3	50 ω.-2 W.	A-105162-50	TUBES		
123-1	1.5 MMFD.-1000 V.	A-104591-3	134-3	MON. FILTER	A-105375-1	143-4	50 ω.-2 W.	A-105162-50	VT-94	MONITOR	6J5
123-2	1.5 MMFD.-1000 V.	A-104591-3	134-4	MON. FILTER	A-105375-1	143-5	50 ω.-2 W.	A-105162-50	VT-204	AMPLIFIERS	HK-24-G
124	.1 MFD.-600 V.	A-104625-1	135	GRID TANK	A-104635	144-1	14000 ω.-2 W.	A-105162-143			
125	.0005 MFD.-5000 V.	A-104195-6	136	PLATE TANK	A-105235	144-2	14000 ω.-2 W.	A-105162-143			
126-1	.0005 MFD.-1000 V.	A-104591-2	137	ANT. COUPLING	AA-105288-1	144-3	14000 ω.-2 W.	A-105162-143			
126-2	.0005 MFD.-1000 V.	A-104591-2	138	ANT. COUPLING	AA-105996-1	144-4	14000 ω.-2 W.	A-105162-143			
127	.005 MFD.-1000 V.	A-104195-5				145-1	3000 ω.-2 W.	A-105162-302			

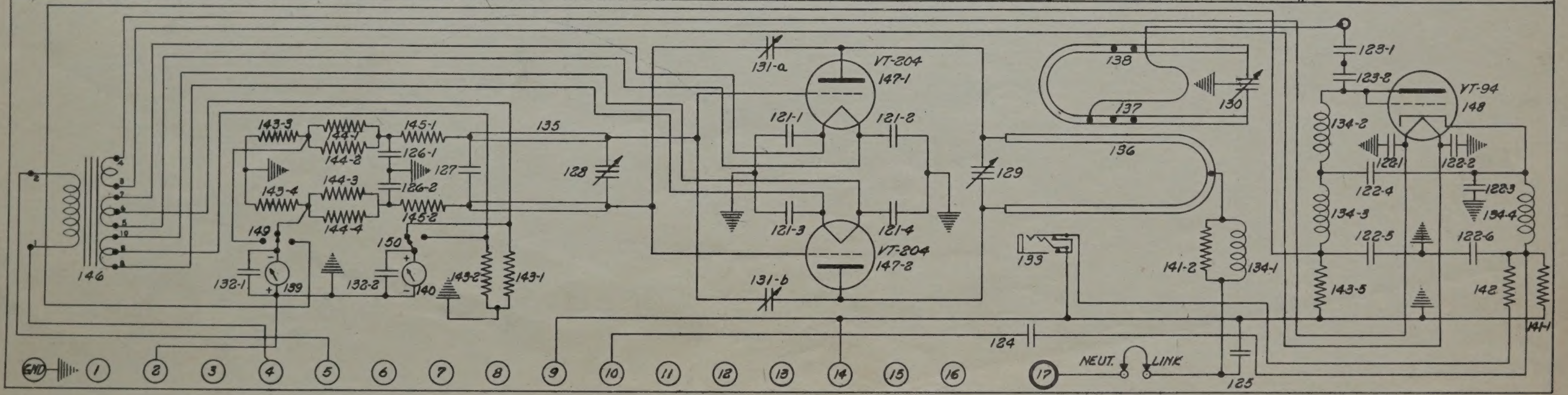
VT-204
147-1
131-a
121-1
121-2
121-3
121-4
VT-204
147-2
131-b
128
129
135
136
137
138
130
VT-94
148
123-1
123-2
134-2
122-1
122-2
122-3
122-4
134-3
134-4
122-5
122-6
143-5
142
141-1
141-2
134-1
133
124
125
NEUT.
LINK
143-3
143-4
144-1
144-2
144-3
144-4
145-1
145-2
126-1
126-2
127
149
150
132-1
132-2
139
140
143-1
143-2
146
GND
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FIGURE 34—AMPLIFIER PANEL PN-8-A, SCHEMATIC DIAGRAM